BACHELOR OF TECHNOLOGY

Electronics Communication Engineering

COURSE STRUCTURE & SYLLABUS

(Batches admitted from the Academic Year 2018 -2019)

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(Autonomous Institution-UGC, Govt. of India)

Accredited by NBA & NAAC with 'A' Grade, UGC, Govt. of India
NIRF Indian Ranking–2020, Accepted by MHRD, Govt. of India
Band Excellent- National Ranking by ARIIA, MHRD, Govt. of India
Affiliated to JNTUH, Approved by AICTE, ISO 9001:2015 Certified Institution, 2nd Rank CSR,
AAAA+ Rated by Digital Learning Magazine, AAA+ Rated by Careers 360 Magazine
Platinum Rated by AICTE-CII Survey, National Ranking-Top 100 Rank band by Outlook,
National Ranking-Top 100 Rank band by Times News Magazine,
141 Natinal Ranking by India Today Magazing
Maisammaguda, Dhullapally, Secunderabad, Kompally-500100

INSTITUTE VISION:

- Visualizing a great future for the intelligentsia by imparting state-of the art Technologies in the field of Engineering and Technology for the bright future and prosperity of the students.
- To offer world class Name training to the promising Engineers.

INSTITUTE MISSION:

- To nurture high level of Decency, Dignity and Discipline in women to attain high intellectual abilities.
- To produce employable students at National and International levels by effective training programmes.
- To create pleasant academic environment for generating high level learning attitudes

Department Vision

Our vision is to develop the department in to a full-fledged centre of learning in various fields of Electronics and Communication Engineering keeping in view the latest developments and to invoke enthusiasm among the students to continually renew their education in the rapidly developing technological scenario.

Department mission

Our mission is to inculcate a spirit of scientific temper and analytical thinking & train the students in contemporary technological trends in electronics and communication to meet the challenging needs of the industry by providing versatile sound knowledge in the field of engineering and technology

PEO 1: Professional Development
To develop in the students the ability to acquire knowledge of Mathematics, Science & Engineering and apply it professionally within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability with due ethical responsibility.
PEO 2: Core Proficiency
To provide ability to identify, formulate, comprehend, analyze, design and solve engineering problems with hands on experience in various technologies using modern tools necessary for engineering practice to satisfy the needs of society and the industry
PEO 3: Technical Accomplishments
To equip the students with the ability to design, simulate, experiment, analyze, optimize and interpret in their core applications through multi disciplinary concepts and contemporary learning to build them into industry ready graduates
PEO4 - Professionalism
To provide training, exposure and awareness on importance of soft skills for better career and holistic personality development as well as professional attitude towards ethical issues, team work, responsibility, accountability, multidisciplinary approach and capability to relate engineering issues to broader social context.
PEO5 - Learning Environment
To provide students with an academic environment and make them aware of excellence, develop the urge of discovery, creativity, inventiveness, leadership, written ethical codes and guidelines and the life-long learning to become a successful professional in Electronics and Communication Engineering

PSO1 The ability to analyze, design and implement application specific electronic system for complex engineering problems for analog, digital domain, communications and signal processing applications by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals.
PSO2 The ability to adapt for rapid changes in tools and technology with an understanding of societal and ecological issues relevant to professional engineering practice through life-long learning
PSO3 Excellent adaptability to function in multi-disciplinary work environment, good interpersonal skills as a leader in a team in appreciation of professional ethics and societal responsibilities.

COURSE STRUCTURE

I Year B. Tech – I Semester (I Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks	
							INT	EXT
1	1800BS01	Mathematics – I	3	1	-	4	30	70
2	1800BS05	Applied Physics	3	1	-	4	30	70
3	1805ES01	Programming for Problem Solving	3	1	-	4	30	70
4	1803ES01	Engineering Graphics	1	-	4	3	30	70
5	1800BS06	Applied Physics Lab	-	-	3	1.5	30	70
6	1805ES61	Programming for Problem Solving Lab	-	-	3	1.5	30	70
7*	1800MC01	Environmental science	3	--	-	-	100	-
8		Induction Programme	-	-	-	-	-	-
		TOTAL	**13**	**3**	**10**	**18**	**280**	**420**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

I Year B. Tech – II Semester (II Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks	
							INT	EXT
1	1800HS01	English	2	-	-	2	30	70
2	1800BS02	Mathematics – II	3	1	-	4	30	70
3	1800BS07	Engineering Chemistry	3	1	-	4	30	70
4	1802ES01	Basic Electrical Engineering	3	-	-	3	30	70
5	1803ES02	Engineering Workshop	1		3	2.5	30	70
6	1800HS02	English Language and Communication Skills Lab	-	-	2	1	30	70
7	1800BS08	Engineering Chemistry Lab	-	-	3	1.5	30	70
8	1802ES61	Basic Electrical Engineering Lab	-	-	2	1	30	70
		TOTAL	**12**	**2**	**10**	**19**	**240**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

II Year B. Tech – I Semester (III Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks	
							INT	EXT
1	1800BS03	Mathematics-III	3	1	-	4	30	70
2	1805ES02	Computer Organization & Operating Systems	3	1	-	4	30	70
3	1804PC01	Electronic Devices & Circuits	3	-	-	3	30	70
4	1804PC02	Signals & Systems	3	-	-	3	30	70
5	1804PC03	Network Analysis	3	-	-	3	30	70
6	1804PC61	Electronic Devices & Circuits Lab	-	-	3	1.5	30	70
7	1804PC62	Basic Simulation Lab	-	-	3	1.5	30	70
8*	1800MC03	Foreign Language: French	2	-	-	-	100	-
		TOTAL	**17**	**2**	**6**	**20**	**310**	**490**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the Degree**

II Year B. Tech – II Semester (IV Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks	
							INT	EXT
1	1805ES03	Basics of Data Structures	3	1	-	4	30	70
2	1804PC04	Analog Circuits	3	-	-	3	30	70
3	1802PC05	Analog and Digital Communications	3	-	-	3	30	70
4	1804PC06	Control Systems	3	-	-	3	30	70
5	1804PC07	Probability Theory & Stochastic Process	3	1	-	4	30	70
6	1804PC63	Analog Circuits Lab	-	-	3	1.5	30	70
7	1804PC64	Analog & Digital Communication Lab	-	-	3	1.5	30	70
8*	1800MC02	Human Values and Professional Ethics	2	-	-	-	100	-
		TOTAL	**17**	**2**	**6**	**20**	**310**	**490**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the Degree**

III Year B. Tech – I Semester (V Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks	
							INT	EXT
1	1800HS04	Managerial Economics & Financial Analysis	3	-	-	3	30	70
2	1800HS06	Professional English	2	1	-	3	30	70
3	1804PC08	Digital System Design	3	-	-	3	30	70
4	1805PC09	Linear & Digital IC Applications	3	-	-	3	30	70
5		Professional Elective -I	3	-	-	3	30	70
6		Open Elective -I	3	-	-	3	30	70
7	1804PC65	Digital System Design Lab	-	-	3	1.5	30	70
8	1804PC66	Linear & Digital IC Applications Lab	-	-	3	1.5	30	70
9*	1800MC04	Indian Constitution	2	-	-	-	100	-
		TOTAL	**19**	**1**	**6**	**21**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the Degree**

III Year B. Tech – II Semester (VI Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks	
							INT	EXT
1	1800HS05	Management Science	3	-	-	3	30	70
2	1804PC10	Digital Signal Processing	3	-	-	3	30	70
3	1804PC11	Electromagnetic Waves	3	-	-	3	30	70
4		Professional Elective -II	3	-	-	3	30	70
5		Professional Elective-III	3	-	-	3	30	70
6		Open Elective -II	3	-	-	3	30	70
7	1804PC67	Digital Signal Processing Lab	-	-	3	1.5	30	70
8	1804PC68	Electromagnetic Waves Lab	-	-	3	1.5	30	70
9*	1804MC05	Technical Communication & Soft skills	2	-	-	-	100	-
		TOTAL	**20**	**-**	**6**	**21**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the Degree**

Industry Oriented Mini Project/ Internship - During Summer Vacation-Evaluation in IV-I

IV Year B. Tech – I Semester (VII Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks	
							INT	EXT
1	1804PC12	Computer Networks	3	-	-	3	30	70
2	1804PC13	Microprocessors & Microcontrollers	3	1	-	4	30	70
3		Professional Elective - IV	3	-	-	3	30	70
4		Open Elective -III	3	-	-	3	30	70
5	1804PC69	Computer Networks Lab	-	-	3	1.5	30	70
6	1804PC70	Microprocessors & Microcontrollers Lab	-	-	3	1.5	30	70
7	1804PR01	Industry Oriented Mini Project /Internship	-	-	-	2	30	70
8	1804PR02	Project -I	-	-	8	4	30	70
9*	1800MC06	Indian Traditional Knowledge	2	-	-	-	100	-
		TOTAL	**14**	**1**	**14**	**22**	**340**	**560**

IV Year B. Tech – II Semester (VIII Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks	
							INT	EXT
1		Professional Elective -V	3	-	-	3	30	70
2		Professional Elective -VI	3	-	-	3	30	70
3		Open Elective -IV	3	-	-	3	30	70
4	1804PR03	Technical Seminar	-	-	-	2	100	-
5	1804PR04	Project - II	-	-	16	8	50	100
		TOTAL	**9**	**-**	**16**	**19**	**240**	**310**

Semester	**I-I**	**I-II**	**II-I**	**II-II**	**III-I**	**III-II**	**IV-I**	**IV-II**	**TOTAL**
Credits	**18**	**19**	**20**	**20**	**21**	**21**	**22**	**19**	**160**

TOTAL Credits: 160

PROFESSIONAL ELECTIVES					
Professional Elective-I		**Professional Elective -II**		**Professional Elective -III**	
1804PE01	Antennas and Wave Propagation	**1804PE04**	Mobile Communications	**1804PE07**	Fiber Optic Communication
1804PE02	Error Correcting Codes	**1804PE05**	Wavelet Transforms	**1804PE08**	Digital Image Processing
1804PE03	Electronic Measurement & Instrumentation	**1804PE06**	Automotive Electronics	**1804PE09**	Robotics Engineering
Professional Elective -IV		**Professional Elective -V**		**Professional Elective -VI**	
1804PE10	Satellite Communications	**1804PE13**	Radar Systems	**1804PE16**	Wireless Sensor Networks
1804PE11	DSP Architecture	**1804PE14**	Speech & Audio Processing	**1804PE17**	Consumer Electronics
1804PE12	Embedded Systems	**1804PE15**	CMOS Design	**1804PE18**	Mixed Signal Processing

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(Autonomous Institution-UGC, Govt. of India)

Permanently Affiliated to JNTUH, Approved by AICTE, ISO 9001: 2015 Certified Institution

Accredited by NBA & NAAC with 'A' Grade

NIRF Indian Ranking 2018, Accepted by MHRD Govt. of India

AAA+ Rated by Careers 360 Magazine, Top Hundred Rank band by Outlook, 7th Rank CSR

List of Open Electives offered by Various Departmets for B.Tech. III & IV Year

S. No	Name of the Department Offering Open Electives	Open Elective –I (Semester- V)	Open Elective -II (Semester –VI)	Open Elective –III (Semester –VII)	Open Elective –IV (Semester –VIII)
1	Electronics & Communication Engineering	1804OE01: Principles of Electronic Communications 1804OE02: Introduction to Signals Systems	1804OE03 : Principles of Computer Communications & Networks 1804OE04: Fundamentals of Digital Signal Processing	1804OE05:Microprocessor and Interfacing 1804OE06:Speech Processing	1804OE07:Principles of Wireless Communications & Networks 1804OE08: Image Processing and Applications
2	Computer Science & Engineering	1805OE01: Operating Systems Principles 1805OE02: Data& Knowledge Mining	1805OE03: Java Programming 1805OE04: Software Testing Methodologies	1805OE05:**Fundamentals of Database Management Systems** 1805OE06:Information Security	1805OE07:Fundamentalsof Data Analytics 1805OE08:Computer Forensics
3	Information Technology	1812OE01: Python Programming 1812OE02: Software Engineering Principles	1812OE03:Web Design 1812OE04:Design Patterns	1812OE05: Introduction to Linux 1812OE06: Cryptography and Network Security	1812OE07:R-Programming 1812OE08:Scripting Languages
4	Electrical & Electronics Engineering	1802OE01:Fundamentals of Electrical Engineering 1802OE02:Elements of Electrical Engineering	1802OE03:Principles of Power System Engineering 1802OE04: Basics Control System Engineering	1802OE05:Renewable Energy Systems 1802OE06: Utilization of Solar Energy	1802OE07:Energy storage Systems 1802OE08:Illumination Engineering

ECE

SYLLABUS

B.Tech - I YEAR

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

B.Tech. I Year I Sem. **L / T/ P/ C**
3/ 1 / 0/ 4

(1800BS01) MATHEMATICS - I

Course Objectives:

- To learn Types of matrices and their properties.
- Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form.
- Concept of Sequence.
- Concept of nature of the series.
- Geometrical approach to the mean value theorems and their application to the mathematical problems Evaluation of surface areas and volumes of revolutions of curves.
- Evaluation of improper integrals using Beta and Gamma functions
- Partial differentiation, concept of total derivative
- Finding maxima and minima of function of two and three variables.

Course Outcomes:

- Identify and classify different types of matrices, determine the rank and inverse of non-singular matrices and solve systems of linear equations using various mets.
- Evaluate the Eigen values and Eigenvectors and reduce the quadratic form to canonical form using orthogonal transformations.
- Solve the applications on the mean value theorems
- Understand and utilize improper integrals, including Beta and Gamma functions.
- Find the extreme values of functions of two variables with/ without constraints
- Evaluate the multiple integrals and apply the concept to find areas, volumes

UNIT-I: Matrices

Matrices: Types of Matrices, Symmetric; Hermitian; Skew-symmetric; Skew-Hermitian; orthogonal matrices; Unitary Matrices; rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations; solving system of Homogeneous and Non-Homogeneous equations. Gauss elimination method; Gauss Seidel Iteration Method.

UNIT-II: Eigen values and Eigen vectors

Linear Transformation and Orthogonal Transformation: Eigen values and Eigenvectors and their properties: Diagonalization of a matrix; Cayley-Hamilton Theorem (without proof); finding inverse and power of a matrix by Cayley-Hamilton Theorem; Quadratic forms and

Nature of the Quadratic Forms; Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT-III: Sequences & Series

Sequence: Definition of a Sequence, limit; Convergent, Divergent and Oscillatory sequences. Series: Convergent, Divergent and Oscillatory Series; Series of positive terms; Comparison test, p-test, D-Alembert's ratio test; Raabe's test; Cauchy's Integral test; Cauchy's root test; logarithmic test. Alternating series: Leibnitz test; Alternating Convergent series: Absolute and Conditionally Convergence.

UNIT-IV: Calculus

Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem. Taylor's Series. Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates), Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT-V: Multivariable calculus (Partial Differentiation and applications)

Definitions of Limit and continuity. Partial Differentiation; Euler's Theorem; Total derivative; Jacobian; Functional dependence & independence, Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

TEXTBOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition,Pearson, Reprint, 2002.

REFERENCES:

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

B.Tech. I Year I Sem. **L / T/ P/ C**
3/ 1 / 0/ 4

(1800BS05) APPLIED PHYSICS

Course Objectives:

- Students will demonstrate skills in scientific inquiry, problem solving and laboratory techniques.
- Students will be able to demonstrate competency and understanding of the concepts found in Quantum Mechanics, Fiber optics and lasers, Semiconductor physics and
- Electromagnetic theory and a broad base of knowledge in physics.
- The graduates will be able to solve non-traditional problems that potentially draw on knowledge in multiple areas of physics.
- To study applications in engineering like memory devices, transformer core and electromagnetic machinery.

Course Outcomes: Upon graduation:

- Understand the fundamental concepts of black body radiation, quantum physics and Quantum behavior of matter in its atomic and subatomic state.
- Classify the energy bands of semiconductors, interpret the direct and indirect band gap semiconductors, identify the type of semiconductor using Hall Effect and identify the applications of semiconductors in electronic devices
- Classify different optoelectronic devices and their applications in modern technology
- Understand the basic concepts of LASER light Sources, identifies the engineering applications of lasers, classify optical fibres based on refractive index profile and mode of propagation and identify the applications of optical fibers in various fields.
- Analyze characterization and study of properties of material help the students to prepare new materials for various engineering applications.
- Exposed to the phenomena of electromagnetism and also to have exposure on magnetic materials and dielectric materials.

UNIT-I: Quantum Mechanics

Introduction to quantum physics, Black body radiation, Planck's law, Photoelectric effect, Compton effect, de-Broglie's hypothesis, Wave-particle duality, Davisson and Germer experiment, Heisenberg's Uncertainty principle, Wave function and its physical significance, Schrodinger's time independent wave equation, Particle in one dimensional box.

UNIT-II: Semiconductor Physics

Intrinsic and Extrinsic semiconductors, Fermi level in intrinsic and extrinsic semiconductors, calculation of carrier concentration in intrinsic and extrinsic semiconductors, Carrier generation and recombination, Carrier transport: diffusion and drift, Hall effect: determination of Hall coefficient and experiment, Hall voltage, direct and indirect band gap semiconductors, p-n junction diode: energy band diagram for open and closed circuits , Zener diode and their V-I Characteristics.

UNIT-III: Optoelectronics

Radiative and non-radiative recombination mechanisms in semiconductors, LED and semiconductor lasers: Device structure, Materials, Characteristics and figures of merit, Semiconductor photo detectors: Solar cell, PIN and Avalanche and their structure, Materials, working principle and Characteristics.

UNIT-IV: Lasers and Fiber Optics

Lasers: Characteristics of Lasers, interaction of radiation with matter: stimulated absorption, spontaneous and stimulated emission, Einstein's relations, Principle and working of Laser: Population inversion, Pumping mechanisms, Types of Lasers: Ruby laser, He-Ne laser, Applications of laser. Fiber Optics: Introduction Optical fiber, Optical fiber as a dielectric wave guide, Total internal reflection, Acceptance angle, Acceptance cone and Numerical aperture, mode and transmission of signal through Step and Graded index fibers, Losses associated with optical fibers, Applications of optical fibers in communication system (block diagram) and in other fields.

UNIT-V: Dielectric and Magnetic Properties of Materials

Electric dipole, dipole moment, dielectric constant, polarizability, electric displacement, electric susceptibility, types of polarization: electronic, ionic and orientation (qualitative) polarizations, calculation of polarizabilities of electronic and ionic polarization, Internal fields in a solid, Clausius-Mossotti equation, Ferroelectrics, Piezo electrics and Pyro electrics, Magnetization, field intensity, magnetic field induction, permeability and susceptibility, Bohr magneton, Classification of magnetic materials on the basis of magnetic moment, hysteresis curve based on domain theory, soft and hard magnetic materials.

TEXT BOOKS:

1. Engineering Physics, B.K. Pandey, S. Chaturvedi - Cengage Learing.
2. Halliday and Resnick, Physics - Wiley.
3. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S.Chand

REFERENCES:

1. Richard Robinett, Quantum Mechanics
2. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S.Chand
3. J. Singh, Semiconductor Optoelectronics: Physics and Technology, Mc Graw-Hill inc. (1995).
4. Online Course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak Guptha on NPTEL

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

B.Tech. I Year I Sem. **L / T/ P/ C**
3/ 1 / 0/ 4

(1805ES01) PROGRAMMING FOR PROBLEM SOLVING

Course Objectives:

- To learn the fundamentals of computers.
- To understand the various steps in program development.
- To learn the syntax and semantics of C programming language.
- To learn the usage of structured programming approach in solving problems.

Course Outcomes: The student will learn

- Differentiate between primary components of a computer system and an Understanding on algorithms designing.
- Transform structured algorithms and flowcharts to solve problems and construct program solutions
- Apply control structures and looping to design logical flows and demonstrate usage of arrays and strings for efficient data manipulation.
- Implement functions to develop reusable code and evaluate the impact of storage classes and scope on program behaviour.
- Analyse and utilize data structures and pointers to create modular and memory-efficient code.
- Construct file handling operations and compare basic searching and sorting algorithms

UNIT I:

Introduction: Introduction to components of a computer system: disks, primary and secondary memory, processor, operating system, compilers, creating, compiling and executing a program etc., Number systems.

Introduction to Algorithms: steps to solve logical and numerical problems. Representation of Algorithm, Flowchart/Pseudo code with examples, Program design and structured programming. Introduction to C Programming Language: **Structure of a C program, Identifiers**, variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code , Operators- Arithmetic operators, relational and logical operators, increment and decrement operators, Bitwise operators, conditional operator, assignment operator, expressions and precedence, Expression evaluation, type conversion,typedef, The main method and command line arguments.

I/O: Simple input and output with scanf and printf, formatted I/O, Introduction to stdin, stdout and stderr.

UNIT II:

Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, ternary operator, goto, Iteration with for, while, do

while loops
Arrays: one and two dimensional arrays, creating, accessing and manipulating elements of arrays.
Strings: Introduction to strings, handling strings as array of characters, basic string functions available in C (strlen, strcat, strcpy, strstr etc.), arrays of strings

UNIT – III

Functions: Designing structured programs, declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, Passing arrays to functions, passing pointers to functions, idea of call by reference, Some C standard functions and libraries, Passing 1-D arrays, 2-D arrays to functions
Recursion: Simple programs, such as Finding Factorial, Fibonacci series, Towers of Hanoi etc., Limitations of Recursive functions ,
Storage Classes - extern, auto, register, static, scope rules, block structure.

UNIT IV:

Structures: Defining structures, initializing structures, unions, Array of structures
Pointers: Idea of pointers, Defining pointers, Pointers to Arrays and Structures, pointers to pointers ,Use of Pointers in self-referential structures, usage of self referential structures in linked list (no implementation) Enumeration data type and bit-fields.
Storage classes (auto, extern, static and register).
Dynamic Memory Management functions, Preprocessing Directives, Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef .

UNIT – V

File Handling: Files: Text and Binary files, Creating and Reading and writing text and binary files, Appending data to existing files, Writing and reading structures using binary files, Random access using fseek, ftell and rewind functions

Introduction to Algorithms: Algorithms for finding roots of quadratic equations, finding minimum and maximum numbers of a given set, finding if a number is prime number, etc. Basic searching in an array of elements (linear and binary search techniques), Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms), Basic concept of order of complexity through the example programs

Text Books:

1. Computer Science: A Structured Programming Approach Using C, B. A. Forouzan and R. F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh , Second Edition, Oxford University Press.

Reference Books:

1. The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, Second Edition, Pearson education.
2. Programming wit
3. h C, B. Gottfried, 3rd edition, Schaum's outlines, McGraw Hill Education (India) Pvt

Ltd.
4. C From Theory to Practice, G S. Tselikis and N D. Tselikas, CRC Press.
5. Basic computation and Programming with C, Subrata Saha and S. Mukherjee, Cambridge University Press

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

B.Tech. I Year I Sem. **L / T/ P/ C**
1/ 0 / 4/ 3

(1803ES01) ENGINEERING GRAPHICS

Course objectives:

- To provide basic concepts in engineering drawing.
- To impart knowledge about standard principles of orthographic projection of objects.
- To draw sectional views and pictorial views of solids.

Course Outcomes: At the end of the course, the student will be able to:

- Demonstrate proficiency in using AutoCAD software to create, edit, and manipulate 2D engineering drawings.
- Apply the concepts of engineering drawing for sketching conic sections and cycloids
- Analyze position of points and lines for representing their orthographic projections..
- Sketch orthographic projections of planes and solids to analyze their different orientations.
- Apply the principle of projections for sketching the isometric views.
- Interpret the given orthographic projections to convert isometric view and vice versa

UNIT – I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid, Scales – Plain & Diagonal.

UNIT- II

Orthographic Projections: Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of Plane regular geometric figures.—Auxiliary Planes.

UNIT – III

Projections of Regular Solids – Auxiliary Views - Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views – Sections of Sphere.

UNIT – IV

Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone, Intersection of Solids: Intersection of – Prism vs Prism- Cylinder Vs Cylinder.

UNIT – V

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views –Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound

Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa – Conventions

Introduction to CAD: (For Internal Evaluation Weightage only):
Introduction to CAD Software Package Commands.- Free Hand Sketches of 2D- Creation of 2D Sketches by CAD Package.

TEXTBOOKS:

1. Engineering Drawing N.D. Bhatt / Charotar
2. Engineering Drawing / N. S. Parthasarathy and Vela Murali/ Oxford

REFERENCE BOOKS:

1. Engineering Drawing / Basant Agrawal and McAgrawal/ McGraw Hill
2. Engineering Drawing/ M. B. Shah, B.C. Rane / Pearson.
3. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

B.Tech. I Year I Sem. **L / T/ P/ C**
0/ 0 / 3/ 1.5

(1800BS06) APPLIED PHYSICS LAB

COURSE OUTCOMES :

- Demonstrate classification of semiconductors with calculation of energy band gap.
- Explain the characteristics and critical values of simple electronic circuits like solar cell, Laser diode and light emitting diode.
- Calculation of the physical values like Planks constant using principles of optical phenomenon.
- Demonstrate the electric and magnetic field effects involved in Stewart and Gee's Experiment and Hall Effect experiment.
- Demonstrate how to calculate the numerical aperture and bending losses associated with fibers.
- Calculate the time constant of RC circuit and frequency response of LCR series and parallel circuits

List of Experiments:
(Any 8 experiments are mandatory)

1. Energy gap of P-N junction diode-To determine the energy gap of a semiconductor diode.
2. Solar Cell-To study the V-I Characteristics of solar cell.
3. Light emitting diode-Plot V-I and P-I characteristics of light emitting diode.
4. Stewart – Gee's experiment-Determination of magnetic field along the axis of a current carrying coil.
5. Hall effect-To determine Hall co-efficient of a given semiconductor.
6. Optical fibre-To determine the Numerical Aperture of given Optic fibre.
7. LASER-To study the characteristics of LASER sources.
8. Optical fibre-To determine the bending losses of Optical fibre.
9. LCR Circuit-To determine the Quality factor of LCR Circuit.
10. R-C Circuit-To determine the time constant of R-C circuit.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

B.Tech. I Year I Sem. **L / T / P/ C**
0 / 0/ 3/ 1.5

(1805ES61) PROGRAMMING FOR PROBLEM SOLVING LAB

Course Objectives: The students will learn the following:

- To work with an IDE to create, edit, compile, run and debug programs
- To analyze the various steps in program development.
- To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
- To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
- To write programs using the Dynamic Memory Allocation concept.
- To create, read from and write to text and binary files

Course Outcomes: The candidate is expected to be able to:

- Formulate the algorithms and translate it to a working and correct program
- Identify and correct logical syntax errors encountered during execution
- Represent and manipulate data with arrays, strings and structures
- Use pointers of different types
- Create, read and write to and from simple text and binary files
- Modularize the code with functions so that they can be reused

Practice sessions:

a. Write a simple program that prints the results of all the operators available in C (including pre/ post increment, bitwise and/or/not, etc.). Read required operand values from standard input.
b. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values form standard input.

Simple numeric problems:

a. Write a program for fiend the max and min from the three numbers.
b. Write the program for the simple, compound interest.
c. Write program that declares Class awarded for a given percentage of marks, where mark <40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >= 70% = Distinction. Read percentage from standard input.

d. Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, for a number 5 and rows = 3, the output should be:
   5 x 1 = 5
   5 x 2 = 10
   5 x 3 = 15
e. Write a program that shows the binary equivalent of a given positive number between 0 to 255.

Expression Evaluation:

i. A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor. (Use the formula s = ut+(1/2)at^2 where u and a are the initial velocity in m/sec (= 0) and acceleration in m/sec^2 (= 9.8 m/s^2)).
ii. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)
iii. Write a program that finds if a given number is a prime number
iv. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
v. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
vi. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
vii. Write a C program to find the roots of a Quadratic equation.
viii. Write a C program to calculate the following, where x is a fractional value.
   1-x/2 +x^2/4-x^3/6
ix. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression: 1+x+x^2+x^3+.....+x^n. For example: if n is 3 and x is 5, then the program computes 1+5+25+125.

Arrays and Pointers and Functions:

a. Write a C program to find the minimum, maximum and average in an array of integers.
b. Write a functions to compute mean, variance, Standard Deviation, sorting of n elements in single dimension array.
c. Write a C program that uses functions to perform the following:
d. Addition of Two Matrices
e. ii. Multiplication of Two Matrices
f. iii. Transpose of a matrix with memory dynamically allocated for the new matrix as row and column counts may not be same.
g. Write C programs that use both recursive and non-recursive functions
h. To find the factorial of a given integer.
i. ii. To find the GCD (greatest common divisor) of two given integers.

j. iii. To find x^n
k. Write a program for reading elements using pointer into array and display the values using array.
l. Write a program for display values reverse order from array using pointer.
m. Write a program through pointer variable to sum of n elements from array.

Strings:

a. Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.
b. Write a C program that converts a number ranging from 1 to 50 to Roman equivalent
c. Write a C program that uses functions to perform the following operations:
   i. To insert a sub-string in to a given main string from a given position.
   ii. To delete n Characters from a given position in a given string.
d. Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abcba, etc.)
e. Write a C program that displays the position of a character ch in the string S or – 1 if S doesn‘t contain ch.
f. Write a C program to count the lines, words and characters in a given text.

Structures & Unions:

a. Write a C program that uses functions to perform the following operations using Structure
   f. Reading a complex number
   ii. Writing Complex Number
   iii. Addition of 2 Complex Numbers
   iv. Multiplication of two complex numbers
b. Write a C program to store information of 5 students using structures.
c. Write a C program to Access all structures members using pointer structure variable.
d. Write a C program to access members of union?

Files:

a. Write a C program to display the contents of a file to standard output device.
b. Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.
c. Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command line arguments.
d. Write a C program that does the following:
   It should first create a binary file and store 10 integers, where the file name and 10 values are given in the command line. (hint: convert the strings using atoi function) Now the program asks for an index and a value from the user and the value at that index should be changed to the new value in the file. (hint: use fseek function).The program should then read all 10 values and print them back.

e. Write a C program to merge two files into a third file (i.e., the contents of the firs t file followed by those of the second are put in the third file).

Miscellaneous:

a. Write a menu driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.

b. Write a C Program to construct a pyramid of numbers as follows:

```
*1          1          1          *
* *        2 3        2 2        * *
* * *      4 5 6      3 3 3      * * *
                      4 4 4 4    * *
                                 *
```

c. Write a C Program implement Student Data Base System Using Files & Structures.

Sorting and Searching:

a. Write a C program that uses non recursive function to search for a Key value in a given list of integers using linear search method.
b. Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers using binary search method.
c. Write a C program that implements the Bubble sort method to sort a given list of integers in ascending order.
d. Write a C program that sorts the given array of integers using selection sort in descending order
e. Write a C program that sorts the given array of integers using insertion sort in ascending order
f. Write a C program that sorts a given array of names

Suggested Reference Books for solving the problems:

i. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
ii. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition)
iii. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice
iv. Hall of India
v. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
vi. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
vii. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

B.Tech. I Year I Sem. **L / T/ P/ C**
3/ 0 / 0/ 0

(1800MC01) ENVIRONMENTAL SCIENCE

Course Objectives:

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations

Course Outcomes:

- Develop critical-thinking skills, analyze real-world problems, and understand the power of narrative to create sustainable solutions for local and global communities.
- Understand the scarcity of natural resources and will be able to replace them with alternative energy resources for the sustainability of environmental society & economy.
- Recognize the type of biodiversity along the values & conservation biodiversity and know about the biogeographically regions.
- Categorize the types of environmental pollution & the various treatment technologies for the diminution of environmental pollutants and contaminants.
- Summarize the global environmental issues to create awareness about the international conventions and protocols for extenuating global environmental issues.
- Understand the importance of environmental legislation policies, sustainable development and concept of green building

UNIT-I

Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT-II

Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT-III

Biodiversity And Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV

Environmental Pollution and Control Technologies: **Environmental Pollution:** Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution**: Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Issues and Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

UNIT-V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.

2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS.Publications.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

B.Tech. I Year II Sem. **L / T/ P/ C**
2/ 0 / 0/ 2

(1800HS01) ENGLISH

INTRODUCTION

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students.

In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. *The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.*

Learning Objectives: The course will help to

1. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
2. Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus.
3. Develop study skills and communication skills in formal and informal situations.

Course Outcomes: Students should be able to

- Use English Language effectively in spoken and written forms.
- Comprehend the given texts and respond appropriately.
- Communicate confidently in various contexts and different cultures
- The students will be able to understand meaning of words, phrases and sentences in context.
- Acquire basic proficiency in English including reading and listening,
- Understand and express simple narratives, descriptions and day to day conversations.

UNIT –I

'The Raman Effect' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary Building: The Concept of Word Formation --The Use of Prefixes and Suffixes.
Grammar: Identifying Common Errors in Writing with Reference to Articles and

Prepositions.**Reading:** Reading and Its Importance- Techniques for Effective Reading.**Basic Writing Skills:** Sentence Structures - Use of Phrases and Clauses in Sentences-Importance of Proper Punctuation- Techniques for writing precisely – **Paragraph writing** – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT –II

'Ancient Architecture in India' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Synonyms and Antonyms – **Idioms and phrases.**

Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.

Reading: Improving Comprehension Skills – Techniques for Good Comprehension

Writing: Format of a Formal Letter-**Writing Formal Letters** E.g.., Letter of Complaint, Letter of Requisition, Job Application with Resume.

UNIT –III

'Blue Jeans' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Acquaintance with Prefixes and Suffixes from Foreign Languages in English to form Derivatives-Words from Foreign Languages and their Use in English.

Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.

Reading: Sub-skills of Reading- Skimming and Scanning

Writing: Nature and Style of Sensible Writing- **Defining- Describing** Objects, Places and Events – **Classifying**- Providing Examples or Evidence, ***e-mail Writing and practices***.

UNIT –IV

'What Should You Be Eating' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Standard Abbreviations in English

Grammar: Voice - Redundancies and Clichés in Oral and Written Communication.

Reading: Comprehension- Intensive Reading and Extensive Reading

Writing: Writing Practices--Writing Introduction and Conclusion - Essay Writing-Précis Writing.

UNIT –V

'How a Chinese Billionaire Built Her Fortune' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: **One word substitution** and Technical Vocabulary and their usage

Grammar: Reported speech and Common Errors in English

Reading: Reading Comprehension-Exercises for Practice

Writing: Report writing - Introduction – Characteristics of a Report – Categories of Reports, Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.

Prescribed Textbook:

1. **Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.**

References:

1. Swan, M. (2016). Practical English Usage. Oxford University Press.
2. Kumar, S and Lata, P.(2018). Communication Skills. Oxford University Press.
3. Wood, F.T. (2007).Remedial English Grammar. Macmillan.
4. Zinsser, William. (2001). On Writing Well. Harper Resource Book.
5. Hamp-Lyons, L. (2006).Study Writing. Cambridge University Press.

Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

B.Tech. I Year II Sem. **L / T/ P/ C**
3/ 1 / 0/ 4

(1800BS02) MATHEMATICS – II

Course Objectives:

1. To learn Methods of solving the differential equations of first and higher order
2. Evaluation of multiple integrals and their applications
3. The physical quantities involved in engineering field related to vector valued functions
4. The basic properties of vector valued functions and their applications to line, surface and volume integrals

Course Outcomes: After learning the contents of this paper the student must be able to

- Identify whether the given differential equation of first order is exact or not and solve the first order differential equations.
- Solve higher differential equation and apply the concept of differential equation to real world problems.
- Calculate the Laplace transform of standard functions both from the definition and by using formulae.
- Use the Laplace transforms techniques for solving ODE's.
- Find the directional derivatives, Irrotational and Solenoidal function and angle between the surfaces.
- Evaluate the line, surface and volume integrals and converting them from one to another

UNIT-I

First Order ODE Exact, linear and Bernoulli's equations; Applications: Newton's law of cooling, Law of natural growth and decay; Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

UNIT-II

Ordinary Differential Equations of Higher Order Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{ax}, *sin ax, cos ax*, polynomials in x, $e^{ax}V(x)$ and $x\ V(x)$, method of variation of parameters. Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation.

UNIT-III

Multivariable Calculus (Integration): Evaluation of Double Integrals (Cartesian and polar coordinates); change of order of integration (only Cartesian form); Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals.
Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals), Centre of mass and Gravity (constant and variable densities) by double and triple integrals (applications involving cubes, sphere and rectangular parallelopiped).

UNIT-IV

Vector Differentiation: Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Tangent plane and normal line. Vector Identities. Scalar potential functions. Solenoidal and Irrotational vectors.

UNIT-V

Vector Integration: Line, Surface and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson,Reprint, 2002.

REFERENCES:

1. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishes
2. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

B.Tech. I Year II Sem. **L / T/ P/ C**
3/ 1 / 0/ 4

(1800BS07) ENGINEERING CHEMISTRY

Course Objectives:

1. To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.
2. To impart the basic knowledge of atomic, molecular and electronic modifications which makes the student to understand the technology based on them.
3. To acquire the knowledge of electrochemistry, corrosion and water treatment which are essential for the Engineers and in industry.
4. To acquire the skills pertaining to spectroscopy and to apply them for medical and other fields.
5. To impart the knowledge of stereochemistry and synthetic aspects useful for understanding reaction pathways

Course Outcomes: The basic concepts included in this course will help the student to gain:

1. Understand the knowledge of atomic, molecular and electronic changes, band theory related to conductivity.
2. Apply to know the modern technology and interpret different problems involved in industrial utilization of water.
3. Apply the required principles and concepts of electro chemistry to predict the behavior of a system under different variables
4. Analyze the underlying causes and consequences of corrosion, distinguishing between various corrosion types and evaluate advanced corrosion control strategies
5. Understand the knowledge of configurational and conformational analysis of molecules and reaction mechanisms.
6. Understand the required skills to get clear concepts on basic spectroscopy and application to medical and other fields.

UNIT - I

Molecular structure and Theories of Bonding: Atomic and Molecular orbitals. Linear Combination of Atomic Orbitals (LCAO), molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N2, O2 and F2 molecules. π molecular orbitals of butadiene and benzene.
Crystal Field Theory (CFT): Salient Features of CFT – Crystal Field Splitting of transition metal ion d- orbitals in Tetrahedral, Octahedral and square planar geometries. Band structure of solids and effect of doping on conductance.

UNIT - II

Water and its treatment: Introduction – hardness of water – Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness – Estimation of hardness of water by complexometric method. Potable water and its specifications. Boiler troubles: Scales and Sludges, Priming and Foaming, Caustic Embrittlement. Steps involved in treatment of water – Disinfection of water by chlorination and ozonization. Boiler feed water and its treatment – Calgon conditioning, Phosphate conditioning and Colloidal conditioning.

External treatment of water – Ion exchange process. Desalination of water – Reverse osmosis. Numerical problems.

UNIT - III

Electrochemistry and corrosion: Electro chemical cells – electrode potential, standard electrode potential, types of electrodes – Calomel, Quinhydrone and Glass electrode. Nernst equation, Determination of pH of a solution by using quinhydrone and glass electrode. Electrochemical series and its applications. Numerical problems. Potentiometric titrations. Batteries – Primary: Lithium cell , secondary batteries : Lead – acid storage battery and Lithium ion battery, Fuel cells: H_2-O_2 Fuel cell, CH_3OH-O_2 Fuel cell.Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current cathodic methods. Surface coatings – metallic coatings – methods of application: Galavanising , Tinning , Metal Cladding, Electro-deposition, Electroless plating of Nickel.

UNIT - IV

Stereochemistry, Reaction Mechanism and synthesis of drug molecules: Introduction to representation of 3-dimensional structures, Structural and stereoisomers, configurations, symmetry and chirality. Enantiomers, diastereomers, optical activity and Absolute configuration. Conformation alanalysis of n- butane. Substitution reactions: Nucleophilic substitution reactions: Mechanism of SN1, SN2 reactions. Electrophilic and nucleophilic addition reactions: Addition of HBr to propene. Markownikoff and anti Markownikoff's additions. Grignard additions on carbonyl compounds. Elimination reactions: Dehydro halogenation of alkylhalides. Saytzeff rule. Oxidation reactions: Oxidation of alcohols using KMnO4 and chromic acid. Reduction reactions: Reduction of carbonyl compounds using LiAlH4 & NaBH4.Hydroboration of olefins. Structure, synthesis and pharmaceutical applications of Paracetamol and Aspirin.

Unit – V

Spectroscopic techniques and applications: Principles of electronic spectroscopy: Beer Lamberts law, Numerical problems, types of electronic excitations , applications of UV – Visible spectroscopy. IR Spectroscopy: Principle, Modes of vibrations, selection rules, Force Constant ,Some common organic functional groups Wave number regions (C-H, NH_2, OH, -COOH, C=O, C $\equiv$ N, C=C, C $\equiv$ C), applications of IR Spectroscopy, ^{1}H-NMR(NMR Spectroscopy), Principles of NMR spectroscopy, chemical shift, Chemical shifts of some organic protons , Introduction to Magnetic resonance imaging.

Suggested Text Books:

1. Physical Chemistry, by P.W. Atkins
2. Engineering Chemistry by P.C.Jain & M.Jain; Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
3. Fundamentals of Molecular Spectroscopy, by C.N. Banwell
4. Organic Chemistry: Structure and Function by K.P.C. Volhardt and N.E.Schore, 5th Edition.
5. University Chemistry, by B.M. Mahan, Pearson IV Edition.
6. Engineering Chemistry (NPTEL Web-book), by B.L. Tembe, Kamaluddin and M.S.Krishnan

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

B.Tech. I Year II Sem. **L / T/ P/ C**
3/ 0 / 0/ 3

(1802ES01) BASIC ELECTRICAL ENGINEERING

Course Objectives:

1. To introduce the concepts of electrical circuits and its components
2. To understand magnetic circuits, DC circuits and AC single phase & three phase circuits
3. To study and understand the different types of DC/AC machines and Transformers.
4. To import the knowledge of various electrical installations.
5. To introduce the concept of power, power factor and its improvement.

Course Outcomes:

1. Understand and solve the DC circuits using fundamental theorems and time-domain analysis to design and troubleshoot the practical DC circuits.
2. Analyze and apply AC circuit principles such as phasor representation, power calculations, and power factor to optimize the efficiency of electrical systems.
3. Evaluate voltage and current relationships in three-phase circuits to design the balanced three-phase systems.
4. Assess transformer principles and operations including equivalent circuit analysis, efficiency, and three phase connections to enhance the performance of power distribution systems.
5. Demonstrate knowledge of three-phase induction motors, DC motors, and synchronous generators for effective industrial application.
6. Identify and evaluate components of low-tension switchgear and battery systems to ensure safe and efficient electrical installations in various applications.

UNIT-I:

D.C. Circuits: Electrical circuit elements (R, L and C), voltage and current sources, KVL&KCL, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits.

UNIT-II

A.C. Circuits: Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance in series RL- C circuit.
Three-phase balanced circuits, voltage and current relations in star and delta connections.

UNIT-III:

Transformers: Ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

UNIT-IV:

Electrical Machines: Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited dc motor. Construction and working of synchronous generators.

UNIT-V:

Electrical Installations: Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

Suggested Text-Books/Reference-Books:

1. Basic Electrical Engineering - D.P. Kothari and I.J. Nagrath, 3rd edition 2010, Tata McGraw Hill.
2. D.C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
3. L.S. Bobrow, Fundamentals of Electrical Engineering", Oxford University Press, 2011
4. Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson, 2010
5. Electrical Engineering Fundamentals, Vincent Deltoro, Second Edition, Prentice Hall India, 1989.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

B.Tech. I Year II Sem. **L / T/ P/ C**
1/ 0 / 3/ 2.5

(1803ES02) ENGINEERING WORKSHOP

Course Objectives:

1. To Study of different hand operated power tools, uses and their demonstration.
2. To gain a good basic working knowledge required for the production of various engineering products.
3. To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
4. To develop a right attitude, team working, precision and safety at work place.
5. It explains the construction, function, use and application of different working tools, equipment and machines.
6. To study commonly used carpentry joints.
7. To have practical exposure to various welding and joining processes.
8. Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

Course Outcomes: At the end of the course, the student will be able to:

1. Identify and make use of various tools to perform a range of basic manufacturing operations in different trades to make/repair engineering components with workshop safety regulations.
2. Illustrate knowledge of various trade operations based on requirements of the job.
3. Illustrate knowledge of various trade tools based on requirements of the job.
4. Interpret and establish residential wiring circuits according to given specifications and circuit diagram.
5. Demonstrate working principles of power tools in different trades to use and to make with them engineering components.
6. Develop model various basic prototypes to explore its functions and features of a innovative system.

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

I. Carpentry – (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint)
II. Fitting – (V-Fit, Dovetail Fit & Semi-circular fit)
III. Tin-Smithy – (Square Tin, Rectangular Tray & Conical Funnel)
IV. Foundry – (Preparation of Green Sand Mould using Single Piece and Split Pattern)
V. Welding Practice – (Arc Welding & Gas Welding)
VI. House-wiring – (Parallel & Series, Two-way Switch and Tube Light)
VII. Black Smithy – (Round to Square, Fan Hook and S-Hook)

2. TRADES FOR DEMONSTRATION & EXPOSURE:

Plumbing, Machine Shop, Metal Cutting (Water Plasma), Power tools in construction and Wood Working

TEXT BOOKS:

1. Workshop Practice /B. L. Juneja / Cengage
2. Workshop Manual / K. Venugopal / Anuradha.

REFERENCE BOOKS:

1. Work shop Manual - P. Kannaiah/ K. L. Narayana/ SciTech
2. Workshop Manual / Venkat Reddy/ BSP

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

B.Tech. I Year II Sem. **L / T/ P/ C**
0/ 0 / 2/ 1

(1800HS02) ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

The **Language Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives:

1. To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
2. To sensitize students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
4. To improve the fluency of students in spoken English and neutralize their mother tongue influence
5. To train students to use language appropriately for public speaking and interviews
6. Better understanding of nuances of English language through audio- visual experience and group activities
7. Neutralization of accent for intelligibility
8. Speaking skills with clarity and confidence which in turn enhances their employability skills

Syllabus

English Language and Communication Skills Lab (ELCS) shall have two parts:

a. **Computer Assisted Language Learning (CALL) Lab**
b. **Interactive Communication Skills (ICS) Lab**

Listening Skills

Objectives

1. Understand the nuances of English language through audio- visual experience and group activities.
2. Neutralize their accent for intelligibility
3. Speak with clarity and confidence which in turn enhances their employability skills
4. Acquire basic proficiency in LSRW skills, the main pillars of communication
5. Expose students to a variety of self-instructional, learner-friendly modes of language learning
6. Students will be able to strengthen their individual and collaborative work strategies

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.

1. Listening for general content
2. Listening to fill up information
3. Intensive listening
4. Listening for specific information

Speaking Skills

Objectives

1. To involve students in speaking activities in various contexts
2. To enable students express themselves fluently and appropriately in social and professional contexts

• Oral practice: Just A Minute (JAM) Sessions
• Describing objects/situations/people
• Role play – Individual/Group activities
• Group Discussion – Group activities

- **The following course content is prescribed for the English Language and Communication Skills Lab based on Unit-6 of AICTE Model Curriculum 2018 for B.Tech First English. As the syllabus is very limited, it is required to prepare teaching/learning materials by the teachers collectively in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning and timesaving in the Lab)**

Exercise – I

CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening.
Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.

ICS Lab:

Understand: Communication at Work Place- Spoken vs. Written language.
Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise – II

CALL Lab:

Understand: Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context.
Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.

ICS Lab:

Understand: Features of Good Conversation – Non-verbal Communication.
Practice: Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise - III

CALL Lab:

Understand: Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).
Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.

ICS Lab:

Understand: How to make Formal Presentations.
Practice: Formal Presentations.

Exercise – IV
CALL Lab:
Understand: Consonant Clusters, Plural and Past tense Markers
Practice: Words often Miss pelt – Confused/ Misused.

ICS Lab:
Understand: Public Speaking – Exposure to Structured Talks.
Practice: Making a Short Speech – Extempore.

Exercise – V
CALL Lab:
Understand: Listening for General and Specific Details.
Practice: Listening Comprehension Tests.

ICS Lab:
Understand: Group Discussion *and* Interview Skills.
Practice: Case studies on Group Discussions *and Mock* Interviews.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

B.Tech. I Year II Sem. **L / T/ P/ C**
0/ 0 / 3/ 1.5

(1800BS08) ENGINEERING CHEMISTRY LAB

Course Objectives: The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:

1. Estimation of hardness and chloride content in water to check its suitability for drinking purpose.
2. To determine the rate constant of reactions from concentrations as an function of time.
3. The measurement of physical properties like adsorption and viscosity.
4. To synthesize the drug molecules and check the purity of organic molecules by thin layer chromatographic (TLC) technique.

Course Outcomes: The experiments will make the student gain skills on:

1. Ability to perform experiments illustrating the principles of chemistry relevant to the study of science and engineering.
2. To record the amount of hardness and chloride content in water and interpret the significance of its presence in water.
3. Understand the kinetics of a reaction from a change in concentration of reactants or products as a function of time.
4. To evaluate and repot the amount of analyze by using instruments like conductimetry, potentiometer and pH metry.
5. To analyze and predict the significance of properties like adsorption, viscosity and surface tension.
6. To demonstrate the technique of Thin Layer Chromatography (TLC) and synthesis drug molecules widely used in industry.

List of Experiments:

1. Determination of total hardness of water by complexometric method using EDTA
2. Determination of chloride content of water by Argentometry
3. Estimation of an HCl by Conductometric titrations
4. Estimation of Acetic acid by Conductometric titrations
5. Estimation of HCl by Potentiometric titrations
6. Estimation of Fe^{2+} by Potentiometry using $KMnO_4$
7. Determination of rate constant of acid catalysed hydrolysis of methyl acetate
8. Synthesis of Aspirin and Paracetamol
9. Thin layer chromatography calculation of R_f values. eg ortho and para nitro phenols
10. Determination of acid value of coconut oil
11. Verification of freundlich adsorption isotherm-adsorption of acetic acid on charcoal
12. Determination of viscosity of castor oil and ground nut oil by using Ostwald's

viscometer.

13. Determination of partition coefficient of acetic acid between n-butanol and water.
14. Determination of surface tension of a give liquid using stalagmometer.

Experiments beyond syllabus:

1. Preparation of Nylon-6:6.
2. Estimation of Fe+2 by Dichrometry.

References:

1. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand & Co., Delhi)
2. An introduction to practical chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, N. Delhi)
3. Vogel's text book of practical organic chemistry 5th edition
4. Text book on Experiments and calculations in Engineering chemistry – S.S. Dara

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

B.Tech. I Year II Sem. **L / T/ P/ C**
0/ 0 / 2/ 1

(1802ES61) BASIC ELECTRICAL ENGINEERING LAB

Course Objectives:

1. To analyze a given network by applying various electrical laws and network theorems
2. To know the response of electrical circuits for different excitations
3. To calculate, measure and know the relation between basic electrical parameters.
4. To analyze the performance characteristics of DC and AC electrical machines

Course Outcomes:

1. Get an exposure to basic electrical laws by applying Ohm's Law, KCL and KVL.
2. Understand the response of different types of electrical circuits to different excitations.
3. Illustrate the concept of resonance in series RLC circuits.
4. Calculate and analyze the impedance of RL, RC, and RLC series circuits.
5. Analyze performance of dc motors, transformers and three phase induction motors.
6. Understand the measurement and calculation of voltage-current in a balanced three phase circuits.

List of experiments/demonstrations:

1. Verification of Ohms Law

2. Verification of KVL and KCL

3. Transient Response of Series RL and RC circuits using DC excitation

4. Transient Response of RLC Series circuit using DC excitation

5. Resonance in series RLC circuit

6. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits

7. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single Phase Transformer

8. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)

9. Three Phase Transformer: Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta-star, Star-Star)

10. Measurement of Active and Reactive Power in a balanced Three-phase circuit

11. Performance Characteristics of a Separately/Self Excited DC Shunt/Compound Motor

12. Torque-Speed Characteristics of a Separately/Self Excited DC Shunt/Compound Motor

13. Performance Characteristics of a Three-phase Induction Motor

14. Torque-Speed Characteristics of a Three-phase Induction Motor

15. No-Load Characteristics of a Three-phase Alternator

ECE

SYLLABUS

B.Tech – II YEAR

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

B.Tech. II Year I Sem. **L / T/ P/ C**
3/ 1 / 0/ 4

(1800BS03) MATHEMATICS - III
(Complex Analysis & Transform Techniques)

Course Objectives: To learn

1. Differentiation and integration of complex Valued functions
2. Evaluation of integrals using Cauchy's integral formula
3. Laurent's series expansion of complex functions
4. Evaluation of integrals using Residue theorem
5. A periodic function by Fourier series and a non-periodic function by Fourier transform
6. z-transform of a sequence and properties

Course Outcomes: After learning the contents of this paper the student must be able to

1. Understand the concepts of analytic functions and apply the Cauchy-Riemann equations to determine the analyticity of functions in both Cartesian and polar coordinates.
2. Evaluate complex integrals using Cauchy's integral theorem and formulae, as well as apply Taylor's and Laurent series to represent and analyze analytic functions in complex analysis.
3. Identify and classify singularities, calculate residues, and apply the Cauchy Residue Theorem to evaluate improper integrals.
4. Develop Fourier series expansions for periodic functions, including handling even and odd functions and deriving half-range expansions.
5. Apply Fourier transforms to represent functions in terms of sine and cosine transforms and utilize inverse transforms for solution interpretations.
6. Utilize Z-transforms and their properties, including convolution and shifting, to solve difference equations in engineering applications.**UNIT – I**

Analytic Functions: Introduction, Continuity, Differentiability, Analyticity, Cauchy-Riemann equations in Cartesian and polar coordinates(without proof)**.** Harmonic and conjugate harmonic functions-Milne-Thompson method(without proof).

UNIT – II

Complex integration: Line integral, Cauchy's integral theorem, Cauchy's integral formula, and Generalized Cauchy's integral formula, Power series: Taylor's series- Laurent series.

UNIT – III

Singularities and Contour Integration: Singular points, isolated singular points essential singularity,Pole, Residue, Cauchy Residue theorem (Without proof) Residue – Evaluation of residue by formula and by Laurent series – Residue theorem. Evaluation of integrals of the type (a) Improper real integrals $\int_{-\infty}^{\infty} f(x)dx$ (b) $\int_{c}^{c+2\pi} f(\cos\Theta, \sin\Theta)d\Theta$

UNIT – IV

Fourier series: Introduction, Fourier series definition, Dirichlet's conditions, Even and odd functions, Half range sine and cosine series.

UNIT – V

Transform Techniques:

Fourier Transforms: Fourier integral theorem (without proof), Fourier sine and cosine integrals, sine and cosine, transforms, properties, inverse transforms, Finite Fourier transforms.

z-transforms: z- transforms, inverse z-transforms, properties, damping rule, shifting rule, Initial and final value theorems, convolution theorem, solution of difference equation by z-transofrms.

TEXT BOOKS:

1. A first course in complex analysis with applications by Dennis G. Zill and Patrick Shanahan, Johns and Bartlett Publishers.
2. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers.
3. Advanced engineering Mathematics with MATLAB by Dean G. Duffy

REFERENCES:

1. Fundamentals of Complex Analysis by Saff, E. B. and A. D. Snider, Pearson.
2. Advanced Engineering Mathematics by Louis C. Barrett, McGraw Hill.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

II Year B.Tech ECE-I Sem **L / T / P /C**
3 / T / 0 / 4

(1805ES02) COMPUTER ORGANIZATION AND OPERATING SYSTEMS

OBJECTIVES
The main objectives of the course are:

1. To have a through understanding of the basic structure and operation of a digital computer.
2. To discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division.
3. To study the different ways of communicating with I/O devices and standard I/O interfaces.
4. To study the hierarchical memory system including cache memories and virtual memory.
5. To demonstrate the knowledge of functions of operating system memory management scheduling, file system and interface, distributed systems, security and dead locks.
6. To implement a significant portion of an Operating System.

OUTCOMES
Upon completion of the Course, the students will be able to:

1. To Know the Basic structure of a digital computer and Remembering Various types and applications.
2. To Know the Role of Register Transfer Language and Micro Operations in Computer Organization.
3. Analysis of the Micro Programmed Control Memory and The Memory Systems in the Computer.
4. To the Know the Various types of Input-Output Organization with respect to their Input-Output Processor (IOP)and Serial Communication Protocols.
5. To Know the Overview of Computer Operating Systems Functions and Operating Systems Structures.
6. To know the Types of System Model, Deadlock Characterization and The Concept of a File Access Mets.

UNIT - I:

Basic Structure of Computers: Computer Types, Functional UNIT, Basic Operational Concepts, Bus, Structures, Software, Performance, Multiprocessors and Multi Computers, Data Representation, Fixed Point Representation, Floating - Point Representation.

Register Transfer Language and Micro Operations: Register Transfer Language, Register Transfer Bus and Memory Transfers, Arithmetic Micro Operations, Logic Micro Operations,

Shift Micro Operations, Arithmetic Logic Shift Unit, Instruction Codes, Computer Registers Computer Instructions - Instruction Cycle.

Memory - Reference Instructions, Input - Output and Interrupt, STACK Organization, Instruction Formats, Addressing Modes, DATA Transfer and Manipulation, Program Control, Reduced Instruction Set Computer.

UNIT - II:

Micro Programmed Control: Control Memory, Address Sequencing, Microprogram Examples, Design of Control Unit, Hard Wired Control, Microprogrammed Control.

The Memory System: Basic Concepts of Semiconductor RAM Memories, Read-Only Memories, Cache Memories Performance Considerations, Virtual Memories secondary Storage, Introduction to RAID.

UNIT - III:

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer Modes, Priority Interrupt, Direct Memory Access, Input-Output Processor (IOP), Serial Communication; Introduction to Peripheral Components, Interconnect (PCI) Bus, Introduction to Standard Serial Communication Protocols like RS232, USB, IEEE1394.

UNIT - IV:

Operating Systems Overview: Overview of Computer Operating Systems Functions, Operating Systems Structures- Systems Calls, System Programs

Process Management: Process,Process States,Process Control Block,CPU Scheduling Algorithams

Memory Management: Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation, Virtual Memmory, Demand Paging, Page-Replcement Algorithms, Allocation of Frames, Thrashing

UNIT - V:

Principles of Deadlock: System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery from Deadlock.

File System Interface: The Concept of a File, Access Methods, Directory Structure, File System Mounting, File Sharing, Protection.

TEXT BOOKS:

1. Computer Organization - Carl Hamacher, Zvonks Vranesic, SafeaZaky, 5th Edition, McGraw Hill.
2. Computer System Architecture - M.Moris Mano, 3rd edition, Pearson

REFERENCE BOOKS:

1. Computer Organization and Architecture - William Stallings 6th Edition, Pearson
2. Operating System Concepts - Abreham Silberchatz, Peter B. Galvin, Greg Gagne, 8th Edition, John Wiley.
3. Structured Computer Organization - Andrew S. Tanenbaum, 4th Edition, PHI
4. Operating Systems - Internals and Design Principles, Stallings, 6th Edition - 2009, Pearson Education.
5. Modern Operating Systems, Andrew S Tanenbaum 2nd Edition, PHI
6. Principles of Operating System, B. L. Stuart, Cengage Learning, India Edition.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

II Year B.Tech ECE-I Sem **L / T / P /C**
3 / 0 / 0 / 3

(1804PC01) ELECTRONIC DEVICES AND CIRCUITS

OBJECTIVES:

The main objectives of the course are:

1. To familiarize the student with the principal of operation, analysis and design of junction diode, BJT and FET transistors and amplifier circuits.
2. To understand diode as a rectifier.
3. To study basic principal of filter of circuits and various types

OUTCOMES:

After completion of the course, the student will be able to:

1. Understand the qualitative theory, properties, and behavior of P-N junction diodes, including their Breakdown mechanisms and diode equation.
2. Understand the characteristics and operation of special purpose diodes, such as photodiodes, varactor diodes, tunnel diodes, and SCR, at a high level.
3. Analyze different kinds of rectifier circuits and filters, evaluating their harmonic content and voltage control ability
4. Analyze the design and functionality of BJTs by examining their configurations and computing important parameters. Apply various stabilizing and biasing techniques to BJTs at a high level while investigating how they affect thermal stability.
5. Analyze single-stage transistor amplifiers in-depth and at an elevated level. Use the H-Parameter Model to compare performance metrics between configurations
6. Analyze the performance of FETs as voltage-variable resistors and contray their characteristics to Bipolar Junction Transistors (BJTs).

UNIT-I

P-N Junction diode: Qualitative Theory of P-N Junction, P-N Junction as a diode , diode equation, volt-ampere characteristics temperature dependence of V-I characteristic , ideal versus practical, Resistance levels(static and dynamic), transition and diffusion capacitances, diode equivalent circuits, load line analysis, breakdown mechanisms in semiconductor diodes.

Special purpose electronic devices: Principal of operation and Characteristics of Tunnel Diode with the help of energy band diagrams, Varactar Diode, SCR and photo diode.

UNIT-II

Rectifiers, Filters: P-N Junction as a rectifier ,Half wave rectifier, Full wave rectifier, Bridge rectifier , Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L-section filter, π- section filter and comparison of various filters, Voltage regulation using Zener diode.

UNIT-III

Bipolar Junction Transistor: The Junction transistor, Transistor construction, Transistor current components, Transistor as an amplifier, Input and Output characteristics of transistor in

Common Base, Common Emitter, and Common collector configurations. α and β Parameters and the relation between them, BJT Specifications.

BJT Hybrid Model: h-parameter representation of a transistor, Analysis of single stage transistor amplifier using h-parameters: voltage gain, current gain, Input impedance and Output impedance. Comparison of transistor configurations in terms of A_i, R_i ,A_v,and R_o.

UNIT-IV

Transistor Biasing And Stabilisation: Operating point , the D.C and A.C Load lines, Need for biasing , criteria for fixing operating point, B.J.T biasing, Fixed bias, Collector to base bias, Emitter Feedback bias, Self bias techniques for stabilization, Stabilization factors(s, sI, sII), Bias Compensation using diode and transistor(Compensation against variation in VBE, ICO) Thermal run away, Condition for Thermal stability.

UNIT-V

Field Effect Transistor: JFET (Construction, principal of Operation and Volt –Ampere characteristics)-Pinch- off voltage, Small signal model of JFET. FET as Voltage Variable Resistor, Comparison of BJT and FET. MOSFET (Construction, Principle of Operation and symbol), MOSFET characteristics in Enhancement and Depletion modes.

TEXT BOOKS:

1. Millman's Electronic Devices and Circuits – J. Millman, C.C.Halkias, and Satyabrata Jit, 2 Ed.,1998, TMH.
2. Electronic Devices and Circuits – Mohammad Rashid, Cengage Learing, 2013
3. Electronic Devices and Circuits – David A. Bell, 5 Ed, Oxford

REFERENCE BOOKS:

1. Electronic Devices and Circuits,K.Lal Kishore B.S Publications
2. Electronic Devices and Circuits, S.Salivahanan,N.Suresh kumar, McGraw Hill.
3. Electronic Devices and Circuits,Balbir kumar ,shail b.jain, PHI Privated Limted,
4. Electronic Devices and Circuits,A.P Godse, U.A Bakshi , Technical Publications
5. Electronic Devices and Circuits K.S. Srinivasan Anurdha Agencies

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

II Year B.Tech ECE-I Sem **L / T / P /C**
3 / 0 / 0 / 3

(1804PC02) SIGNALS & SYSTEMS

OBJECTIVES:

The main objectives of the course are:

1. Coverage of continuous and discrete-time signals and representations and methods that is necessary for the analysis of continuous and discrete-time signals.
2. Knowledge of time-domain representation and analysis concepts as they relate to difference equations, impulse response and convolution, etc.
3. Knowledge of frequency-domain representation and analysis concepts using Fourier analysis tools, Z-transform.
4. Concepts of the sampling process.
5. Mathematical and computational skills needed in application areas like communication, signal processing and control, which will be taught in other courses.

OUTCOMES:

After completion of the course, the student will be able to:

1. Classify various signal types (e.g., continuous, discrete) and perform fundamental operations to interpret and manipulate signal characteristics.
2. Analyze signals using orthogonal functions and vector spaces, and demonstrate Fourier series and transform applications for both periodic and non-periodic signals.
3. Apply the Fourier Transform to transition between time and frequency domains, Analyze signal properties such as bandwidth, sampling, aliasing, and reconstruction.
4. Examine signal behavior through linear time-invariant (LTI) systems, assessing conditions for distortion less transmission and understanding filter characteristics.
5. Utilize the Laplace Transform for complex signal analysis and relate it to the Fourier Transform in solving real-world signal processing problems.
6. Interpret discrete-time systems through Z-transforms, compare it with other transforms, and apply it to practical discrete-time signal problems.

UNIT I:

Introduction to Signals: Elementary Signals**-** Continuous Time (CT) signals, Discrete Time (DT) signals, Basic Operations on signals, Classification of Signals.

Signal Analysis: Analogy between vectors and signals, orthogonal signal space, Signal approximation using orthogonal functions, Mean square error, Closed or complete set of orthogonal functions, Orthogonality in complex functions.

Fourier Series: Representation of Fourier series, Continuous time periodic signals, Dirichlet's conditions, Trigonometric Fourier Series, Exponential Fourier Series, Properties of Fourier series, Complex Fourier spectrum.

UNIT II:

Fourier Transforms: Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Fourier transform of periodic signals, Properties of Fourier transforms.

Sampling: Sampling theorem **–** Graphical and analytical proof for Band Limited Signals, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, effect of under sampling – Aliasing.

UNIT III:

Signal Transmission through Linear Systems: Introduction to Systems, Classification of Systems, Linear Time Invariant (LTI) systems, system, impulse response, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, System bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Poly-Wiener criterion for physical realization, relationship between bandwidth and rise time.

Convolution of Signals: Concept of convolution in time domain, Graphical representation of convolution.

UNIT-IV:

Laplace Transforms: Review of Laplace transforms, Inverse Laplace transform, Concept of region of convergence (ROC) for Laplace transforms, Properties of L.T's relation between L.T's, and F.T. of a signal. Laplace transform of certain signals using waveform synthesis.

UNIT-V:

Z–Transforms: Concept of Z- Transform of a discrete sequence. Distinction between Laplace, Fourier and Z transforms, Region of convergence in Z-Transform, Inverse Z-Transform, Properties of Z-transforms.

TEXT BOOKS:

1. Signals & Systems - Simon Haykin and Van Veen,Wiley, 2nd Edition.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.

REFERENCE BOOKS:

1. Signals and Systems – A. Anand Kumar, PHI Publications, 3rd edition.
2. Signals, Systems & Communications - B.P. Lathi, BS Publications, 2003.
3. Fundamentals of Signals and Systems Michel J. Robert, MGH International Edition, 2008.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

II Year B.Tech ECE-I Sem **L/ T/ P/ C**
3 / 0/ 0/ 3

(1804PC03) NETWORK ANALYSIS

Pre-requisite: Basic Electrical & Electronics Engineering

OBJECTIVES:

The main objectives of the course are:

1. To understand the basic concepts on RLC circuits.
2. To know the behavior of the steady states and transients states in RLC circuits.
3. To know the basic Laplace transforms techniques in periodic waveforms.
4. To understand the two port network parameters.
5. To understand the properties of LC networks and filters.

OUTCOMES:

After completion of the course, the student will be able to:

1. Formulate mathematical models for physical systems and construct representations of linear time-invariant systems using transfer functions and block diagram.
2. Analyze the structure and benefits of open-loop and closed-loop feedback control systems, and apply signal flow graphs and Mason's gain formula to simplify complex control systems.
3. Analyze the time response of first and second-order systems for standard test inputs and evaluate system stability using Routh-Hurwitz criteria and Root Locus techniques.
4. Apply frequency-response techniques such as Bode and Nyquist plots to evaluate system stability and performance in the frequency domain.
5. Design and evaluate controllers and compensators (P, PI, PD, PID) using root locus and frequency-domain mets to improve system performance.
6. Formulate state-space models and conduct state variable analysis to assess system controllability and observability.

UNIT - I

Review of R, L,C, RC, RL, RLC circuits, Network Topology, Terminology, Basic cutest and tie set matrices for planar networks, Illustrative Problems, Magnetic Circuits, Self and Mutual inductances, dot convention, impedance, reactance concept, Impedance transformation and coupled circuits, co-efficient of coupling, equivalent T for Magnetically coupled circuits, Ideal Transformer.

UNIT - II

Steady state and transient analysis of RC, RL and RLC Circuits, Circuits with switches, step response, 2nd order series and parallel RLC Circuits, Root locus, damping factor, over damped, under damped, critically damped cases, quality factor and bandwidth for series and parallel resonance, resonance curves.

UNIT - III

Network Analysis using Laplace transform techniques, step, impulse and exponentialvexcitation,

response due to periodic excitation, RMS and average value of periodic waveforms.

UNIT - IV

Two port network parameters, Z, Y, ABCD, h and g parameters, Characteristic impedance, Image transfer constant, image and iterative impedance, network function, driving point and transfer functions – using transformed (S) variables, Poles and Zeros.

UNIT - V

Standard T, π , L Sections, Characteristic impedance, image transfer constants, Design of Attenuators, impedance matching network, T and π Conversion, LC Networks and Filters: Properties of LC Networks, Foster's Reactance theorem, design of constant K, LP, HP and BP Filters, Composite filter design.

TEXT BOOKS

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, 3rd Edition, 2000.
2. Networks, Lines and Fields - JD Ryder, PHI, 2nd Edition, 1999.

REFERENCES

1. Engineering Circuit Analysis – William Hayt and Jack E Kemmerly, MGH, 5th Edition, 1993.
2. Electric Circuits – J. Edminister and M.Nahvi – Schaum's Outlines, MCGRAW HILL EDUCATION, 1999.
3. Network Theory – Sudarshan and Shyam Mohan, Mc Graw Hill Education.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution- UGC, Govt. of India)

II Year B.Tech ECE-I Sem **L /T / P/ C**
0 / 0 / 3/ 1.5

(1804PC61) ELECTRONIC DEVICES AND CIRCUITS LAB

COURSE OUTCOMES:

1. Examine, the diode's V-I properties
2. Design and Analysis of Diode applications of electronic devices and circuits and devices like amplifier and filters
3. Understand the working of Amplifiers using small-signal transistors
4. Design and Analyze frequency response of different amplifier configurations (CE, CC, CS)
5. Analyze and realize different electronic diodes.
6. Evaluate the performance of Special purpose electronic diodes such as LEDs & SCRs

PART A: (Only for Viva-voce Examination)
Electronic Workshop Practice (In 3 Lab Sessions):

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays,
   Bread Boards, PCB's
2. Identification, Specifications and Testing of Active Devices, Diodes, BJT's, Low power JFET's, MOSFET's, Power Transistors, LED's, LCD's, SCR, UJT.
3. Study and operation of
   i. Multimeters (Analog and Digital)
   ii. Function Generator
   iii. Regulated Power Supplies
   iv. CRO.

1. P-N junction diode characteristics
2. Zener diode characteristics and Zener as voltage regulator
3. Half -Wave Rectifier with and without filter
4. Full - Wave Rectifier with and without filter
5. Input and output characteristics of transistor in CB configuration
6. Input and output characteristics of transistor in CE configuration
7. FET Characteristics
8. h-parameters of CE configuration
9. Frequency response of CE amplifier
10. Frequency response of CC amplifier
11. Frequency response of common source FET amplifier
12. UJT CHARACTERISITCS

Components Required:

1. Regulated Power supplies (RPS) 0-30 V
2. CRO's 0-20 MHz
3. Function Generators 0-1 MHz
4. Multimeters
5. Decade Resistance Boxes /

Rheostats	
6. Decade Capacitance Boxes	
7. Ammeters (Analog or Digital)	0-20 μA, 0-50μA, 0-100μA, 0-200μA, 0-10 mA
8. Voltmeters (Analog or Digital)	0-50V, 0-100V, 0-250V
9. Electronic Components	Resistors, Capacitors, BJT's, SCR's, UJTs, FET's,LED's, MOSFET's, Diodes- Ge & Si type, Transistors – NPN, PNP type

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution- UGC, Govt. of India)

II Year B.Tech ECE-I Sem **L / T / P/ C**
0 / 0 / 3 / 1.5

(1804PC62) BASIC SIMULATION LAB

COURSE OUTCOMES

1. Perform basic operations on matrices and generate various types of signals and sequences (e.g., unit impulse, step, sinusoidal) for use in signal processing applications.
2. Apply fundamental operations (addition, scaling, shifting, folding) on signals and sequences, and analyze their even and odd components as well as real and imaginary parts.
3. Evaluate the convolution and correlation of signals and sequences to determine linearity, time-invariance, and other key system properties, verifying theoretical concepts experimentally.
4. Demonstrate the synthesis of waveforms using Laplace transforms and compute Fourier transforms of signals, visualizing their magnitude and phase spectra for frequency-domain analysis
5. Analyze and plot pole-zero maps in both s-plane and z-plane to interpret system stability and response characteristics, reinforcing theoretical understanding of transfer functions.
6. Verify the sampling theorem and examine noise removal using correlation techniques, assessing signal quality and system response under various conditions, including Gaussian noise.

Note:

1. All the experiments are to be simulated using MATLAB or equivalent software
2. Minimum of 15 experiments are to be completed

List of experiments:

1. Basic operations on matrices.
2. Generation on various signals and Sequences (periodic and aperiodic), such as unit impulse, unit step, square, sawtooth, triangular, sinusoidal, ramp, sinc.
3. Operations on signals and sequences such as addition, multiplication, scaling, shifting, folding.
4. Finding the even and odd parts of signal/sequence and real and imaginary part of signal.
5. Convolution between signals and sequences.
6. Auto correlation and cross correlation between signals and sequences.
7. Verification of linearity properties of a given continuous /discrete system.
8. Verification of time invariance properties of a given continuous discrete system.
9. Computation of unit sample, unit step and sinusoidal response of the given LTI system and verifying its stability.
10. Waveform synthesis using Laplace transform.
11. Finding the Fourier transform of a given signal and plotting its magnitude and phase spectrum.
12. Locating the zeros and poles and plotting the pole zero maps in s-plane and z-plane for the given transfer function.

13. Generation of Gaussian Noise (real and complex), computation of its mean, M.S. Value and its skew, kurtosis, and PSD, probability distribution function.
14. Sampling theorem verification.
15. Removal of noise by auto correlation/cross correlation.
16. Verification of Weiner-Khinchine relations.
17. Checking a random process for stationary in wide sense.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution- UGC, Govt. of India)

II Year B.Tech ECE-I Sem **L /T / P/ C**
2 / 0 / 0 / 0

(1800MC03) FOREIGN LANGUAGE: FRENCH
(Mandatory Course)

INTRODUCTION

In view of the growing importance of foreign languages as a communication tool in some countries of the world, French has been identified as one of the most popular languages after English. As a result, French program is introduced to develop the linguistic and communicative skills of engineering students and to familiarize them to the French communication skills. This course focuses on basic oral skills.

OBJECTIVES

1. To inculcate the basic knowledge of the French language.
2. To hone the basic sentence constructions in day to day expressions for communication in their vocation.

COURSE OUTCOMES:

1. Students will be able to communicate in French at A1 level.
2. Sentence construction in day to day expressions.
3. Communicate confidently in various contexts and different cultures where French is an official language.
4. The students will be able to understand meaning of words, phrases and sentences in context.
5. Acquire basic proficiency in including reading and listening,
6. Understand and express simple narratives, descriptions and day to day conversations.

SYLLABUS

UNIT - I:

Speaking: Introduction to the French language and culture – Salutations - French alphabet - Introducing people

Writing: Understand and fill out a form

Grammar: The verbs “to be ' and “to have " in the present tense of the indicative

Vocabulary: The numbers from 1 to 20 - Professions - Nationalities

UNIT - II:

Speaking: Talk about one’s family – description of a person - express his tastes and preferences - express possession - express negation

Writing: Write and understand a short message

Grammar: Nouns (gender and number) - Articles - The –er verbs in the present - Possessive adjectives - Qualifying adjectives

Vocabulary: The family – Clothes - Colors - The numbers from 1 to 100 - The classroom

UNIT - III

Speaking: Talk about your daily activities - be in time - ask and indicate the date and time - talk about sports and recreation - express the frequency

Writing: A letter to a friend

Grammar - The expression of time – The –ir verbs in the present - The verbs do, go, take, come, - Adverbs - Reflexive verbs

Vocabulary - The days and months of the year - The sports - Hobbies

UNIT - IV

Speaking: Express the quantity - ask and give the price - express the need, the will and the capacity - compare (adjective) - speak at the restaurant / in the shops

Writing: A dialogue between a vendor and a customer at the market

Grammar: Verbs "to want", "to can" - Express capacity / possibility - Express will / desire – the future tense

Vocabulary: The food – Meals - Fruits and vegetables – The parts of the body

UNIT - V

Speaking: Express the prohibition and the obligation - describe an apartment - talk about the weather / ask the weather - ask the opinion - give your opinion - express your agreement or disagreement

Writing: Descriptions

Grammar: Demonstrative adjectives - Prepositions - The verb 'must' to indicate obligation and necessity in the present

Vocabulary: Seasons – Holidays - The city – Furniture

NOTE: The students are exposed to simple listening and reading activities.

REFERENCE BOOKS

1. Apprenons le Français 1& 2, New Saraswati House, 2015
2. A propos, A1, Langers International, 2010
3. Easy French Step-by-step by Myrna Bell Rochester
4. Ultimate French Beginner-Intermediate (Coursebook) By Livid Language
5. Ã L'Aventure: An Introduction to French Language and Francophone Cultures by Evelyne Charvier-Berman, Anne C. Cummings.

OUTCOMES

1. The students will be able to communicate in French at A1 level.
2. The student will have an advantage in the competitive job market.
3. This course benefits the graduates when pursuing study *opportunities* in the countries where French is the official language.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution- UGC, Govt. of India)

II Year B. Tech ECE-II Sem **L/ T / P / C**
3 / 1 / 0 / 4

(1805ES03) BASICS OF DATA STRUCTURES

Objectives:

1. To impart the basic concepts of data structures and algorithms.
2. To understand concepts about searching and sorting techniques
3. To understand basic concepts about stacks, queues, lists trees and graphs.
4. To enable them to write algorithms for solving problems with the help of fundamental data Structures

Outcomes:

At the end of the course the students are able to:

1. Understand the basic concepts of algorithms, asymptotic notations, and linked data structures.
2. Implement stack and queue ADTs using array and linked representations, and apply them in applications like expression evaluation and circular queues
3. Analyze tree structures, including binary trees, their properties, representations, and traversal methods.
4. Apply searching and sorting algorithms, including static hashing and advanced sorting techniques, and compare their efficiency
5. Understand and implement graph data structures and traversals (DFS, BFS), and analyze search trees, AVL trees, and B-trees.
6. Design and implement efficient data structures and algorithms for practical applications.

UNIT- I

Basic concepts- Algorithm Specification-Introduction, Recursive algorithms, Data Abstraction Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations, Introduction to Linear and Non Linear data structures. Singly Linked Lists-Operations-Insertion, Deletion, Circularly linked lists- Operations for Circularly linked lists, Doubly Linked Lists- Operations- Insertion, Deletion. Representation of single, two dimensional arrays.

UNIT- II

Stack ADT, definition, operations, array and linked implementations in C, applications-infix to postfix conversion, Postfix expression evaluation, Queue ADT, definition and operations, array and linked Implementations in C, Circular queues-Insertion and deletion operations.

UNIT- III

Trees – Terminology, Representation of Trees, Binary tree ADT, Properties of Binary Trees, Binary Tree Representations-array and linked representations, Binary Tree traversals, Max Priority Queue ADT-implementation-Max Heap-Definition, Insertion into a Max Heap, Deletion

from a Max Heap.

UNIT- IV

Searching- Linear Search, Binary Search, Static Hashing-Introduction, hash tables, hash functions, Overflow Handling. Sorting-Insertion Sort, Selection Sort, Radix Sort, Quick sort, Heap Sort, Comparison of Sorting methods.

UNIT- V

Graphs – Introduction, Definition, Terminology, Graph ADT, Graph Representations- Adjacency matrix, Adjacency lists, Graph traversals- DFS and BFS.
Search Trees-Binary Search Trees, Definition, Operations- Searching, Insertion and Deletion, AVL Trees- Definition and Examples, B-Trees-Definition, Comparison of Search Trees.

TEXT BOOKS:

1. Fundamentals of Data structures in C, 2nd Edition, E.Horowitz, S.Sahni and Susan.
2. Data structures A Programming Approach with C, D.S.Kushwaha and A.K.Misra, PHI.

REFERENCE BOOKS:

1. Data structures: A Pseudocode Approach with C, 2nd edition, R.F.Gilberg And B.A.Forouzan, Cengage Learning.
2. Data structures and Algorithm Analysis in C, 2nd edition, M.A.Weiss, Pearson.
3. Data Structures using C, A.M.Tanenbaum,Y. Langsam, M.J.Augenstein, Pearson.
4. Data structures and Program Design in C, 2nd edition, R.Kruse, C.L.Tondo and B.Leung,Pearson.
5. Data Structures and Algorithms made easy in JAVA, 2nd Edition, Narsimha Karumanchi, CareerMonk Publications.
6. Data Structures using C, R.Thareja, Oxford University Press.
7. Data Structures, S.Lipscutz,Schaum's Outlines, TMH. 8. Data structures using C, A.K.Sharma, 2nd edition, Pearson.. 9. Data Structures using C &C++, R.Shukla

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(UGC AUTONOMOUS)

II Year B.Tech ECE-II Sem **L/ T / P / C**
3 / 0 / 0 / 3

(1804PC04) ANALOG CIRCUITS

OBJECTIVES

The main objectives of the course are:

1. To introduce circuit realizations with components such as diodes, BJTs and transistors studied earlier.
2. To give understanding of various types of amplifier circuits such as small signal, cascaded, large signal and tuned amplifiers.
3. To familiarize the Concept of feedback in amplifiers so as to differentiate between negative and positive feedback.

OUTCOMES

Upon completion of the Course, the students will be able to:

a. Understand small signal amplifier circuits applying the biasing techniques learnt earlier.

b. Understand Cascade different amplifier configurations to obtain the required overall specifications like Gain, Bandwidth, Input and Output interfacing Impedances

c. Will have the exposure on JFET ,MOSFET amplifiers

d. Utilize the Concepts of negative feedback to improve the stability of amplifiers and positive feedback to generate sustained oscillations.

e. Design and realize different classes of Power Amplifiers and tuned amplifiers useable for audio and Radio applications

f. Understand small signal amplifier circuits applying the biasing techniques learnt earlier.

UNIT – I

And Design of Small Signal Low Frequency BJT Amplifiers:

CE Amplifier with emitter resistance, low frequency response of BJT Amplifiers, effect of coupling and bypass capacitors, Design of single stage RC coupled amplifier Different coupling schemes used in amplifiers, Analysis of Cascaded RC Coupled amplifiers, Cascode amplifier, Darlington pair,

UNIT – II

Transistor At High Frequency: The Hybrid- pi – Common Emitter transistor model,CE short circuit current gain, current gain with resistive load, single stage CE transistor amplifier

response, Gain-bandwidth product.

UNIT – III

FET Amplifiers: Analysis of JFET Amplifiers, Analysis of CS, CD, CG JFET Amplifiers, comparison of performance with BJT Amplifiers, Basic Concepts of MOS Amplifiers, – MOSFET – MOSFET Characteristics in Enhancement and Depletion mode – MOS Small signal model, Common source amplifier with resistive, Source follower, Common Gate Stage

UNIT –IV

Positive & Negative Feedback In Amplifiers: Classification of amplifiers, Concepts of feedback – Classification of feedback amplifiers – General characteristics of negative feedback amplifiers – Effect of Feedback on Amplifier characteristics – Voltage series, Voltage shunt, Current series and Current shunt Feedback configurations – Simple problems.
Oscillators: Classification of oscillators, Barkhausen criterion, RC phase shift oscillator, Wein bridge oscillator, LC oscillator Hartley and Colpitts oscillator.

UNIT – IV

Large Signal Amplifiers: classification,distortion and amplifiers Class A Power Amplifier, Maximum Value of Efficiency of Class – A Amplifier, Transformer Coupled Amplifier, Push Pull and Complimentary Symmetry Class B and Class AB Power Amplifiers – Transistor Power Dissipation, Heat Sinks.

TEXT BOOKS:

1. Electronic Devices and Circuits, David A. Bell – 5th Edition, Oxford.
2. Electronics circuits and applications , Md H Rashid, Cengage 2014

REFERENCES:

1. Integrated Electronics, Jacob Millman, Christos C Halkias, McGraw Hill Education
2. 2. Electronic Devices and Circuits, S. Salivahanan, N. Suresh Kumar, A Vallvaraj, 5th Edition, MC GRAW HILL EDUCATION.
3. 3. Electronic Devices and Circuits theory– Robert L. Boylestead, Louis Nashelsky, 11th Edition, 2009, Pearson.
4. Electronic Devices Conventional and current version -Thomas L. Floyd 2015.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution- UGC, Govt. of India)

II Year B.Tech ECE-II Sem **L/ T/ P/ C**
3 / 0/ 0/ 3

(1804PC05) ANALOG AND DIGITAL COMMUNICATIONS

OBJECTIVES

The main objectives of the course are:

1. To develop ability to analyze system requirements of analog communication systems.
2. To understand the need for modulation
3. To understand the generation, detection of various analog modulation techniques and also perform the mathematical analysis associated with these techniques.
4. To understand the pulse modulation techniques.
5. To understand the functional block diagram of Digital communication system.
6. To understand the need for source and channel coding.
7. To study various source and channel coding techniques.

OUTCOMES

Upon completion of the course, student should possess the following skills:

1. Able to analyze various analog modulation and demodulation systems.
2. Understand the characteristics of noise present in analog systems.
3. Study of signal to Noise Ration (SNR) performance, of various Analog Communication systems
4. Understand basic components of Digital Communication Systems and analyze the error performance of Digital Modulation Techniques
5. Understand the redundancy present in Digital Communication by using various source coding techniques
6. Know about different error detecting and error correction codes like block codes, cyclic codes

Unit-I: Analog Modulation Schemes: Introduction to communication system, Principles of Amplitude Modulation Systems- DSB, SSB and VSB modulations. Angle Modulation, Representation of FM and PM signals, Spectral characteristics of angle modulated signals.

Unit-II: Noise in Analog Communication: Noise in AM, FOM measurement in AM, DSBSC,SSBSC. Noise in FM, FOM measurement in FM, Pre-emphasis and Deemphasis.
Receivers: TRF Receiver, Super Heterodyne Receiver, Receiver characteristics, TDM, FDM

Unit-III: Pulse Analog modulation Techniques: PAM, PWM, PPM

Introduction to Digital Communication System: Digital Representation of analog signal, Advantages and Disadvantages of Digital Communication,

Waveform Coding Techniques: Pulse code modulation (PCM), Differential pulse code modulation. Delta modulation, Limitations, Adaptive Delta Modulation, S/N Ratio of PCM, DM.

Unit-IV: Information Theory: Information measurement, Entropy, Source coding techniques-Shannon Fano, Huffman, Shannon Hartley laws.
Error control coding: Block codes, Syndrome decoding, cyclic codes, syndrome decoding, convolution encoding, decoding.

Unit-V: Pass band Digital Modulation schemes- ASK, PSK, FSK Generation-coherent and non coherent detection techniques, QPSK, 8PSK,16PSK, QAM-constellation diagrams.
Spread Spectrum Modulation: PN Noise Generation, DS-SS, FH-SS.

TEXT BOOKS:

1. Communications system, S.Haykin, Wiley, 4 edition 2009.
2. Digital and Analog Communication Systems Sam Shanmugam, John Wiley, 2005.

REFERENCES:

1. Principles of Communication Systems -Herbert Taub, Donald L Schiling, Goutam Saha,3rd Edition, Mc Graw -Hill, 2008
2. Electronic communication systems, Wayne Tomasi, 5 edition, Pearson
3. Communication Systems: Analog and Digital,R. P. Singh,S. Sapre, McGraw-Hill Education, 2012
4. Digital Communications –John G. Proakis , Masoud Salehi –5th Edition, McGraw-Hill, 2008.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(UGC AUTONOMOUS)

II Year B.Tech ECE-II Sem **L / T/ P /C**
3 / 0 / 0 / 3

(1802PC06) CONTROL SYSTEMS

OBJECTIVES

The main objectives of the course are:

1. To understand the different ways of system representations such as Transfer function
2. representation and state space representations and to assess the system dynamic response
3. To assess the system performance using time domain analysis and methods for improving it
4. To assess the system performance using frequency domain analysis and techniques for improving the performance
5. To design various controllers and compensators to improve system performance

OUTCOMES

Upon completion of the course, student should possess the following skills:

1. Understand the basic concepts of control systems and analyze the effects of feedback on system performance.
2. Apply mathematical modeling techniques to develop transfer functions for DC servomotor, AC servo motor and synchro's, and represent them using block diagrams and signal flow graphs.
3. Analyze the time response of first- and second-order systems to standard test signals, and evaluate system performance through steady-state errors and error constants.
4. Understand stability concepts and evaluate system stability using Routh-Hurwitz criteria and Root Locus techniques.
5. Apply frequency-response techniques such as Bode and Nyquist plots to evaluate system stability and performance in the frequency domain.
6. Apply state-space mets to represent continuous systems and evaluate state transition matrices for solving time-invariant state equations.

UNIT – I

Introduction: Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems,Feed-Back Characteristics, Effects of feedback. Mathematical models – Differential equations - Impulse Response and transfer functions - Translational and Rotational mechanical systems.

Transfer Function Representation: Transfer Function of DC Servo motor - AC Servo motor-Synchro transmitter and Receiver, Block diagram representation of systems considering electrical systems as examples - Block diagram algebra – Representation by Signal flow graph - Reduction using mason's gain formula.

UNIT-II

Time Response Analysis: Standard test signals - Time response of first order systems –

Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems.

UNIT – III

Stability Analysis: The concept of stability - Routh stability criterion – qualitative stability and conditional stability.

Root Locus Technique: The root locus concept - construction of root loci-effects of adding poles and zeros to G(s) H(s) on the root loci.

Frequency Response Analysis: Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots.

UNIT – IV

Stability Analysis In Frequency Domain: Polar Plots, Nyquist Plots and applications of Nyquist criterion to find the stability - Effects of adding poles and zeros to G(s)H(s) on the shape of the Nyquist diagrams.

Classical Control Design Techniques: Compensation techniques – Lag, Lead, and Lead- Lag Controllers design in frequency Domain, PID Controllers.

UNIT – V

State Space Analysis of Continuous Systems: Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and its Properties.

TEXT BOOKS:

1. "I. J. Nagrath and M. Gopal", "Control Systems Engineering", New Age International (P) Limited, Publishers, 5th edition, 2009
2. "B. C. Kuo", "Automatic Control Systems", John wiley and sons, 8th edition, 2003.

REFERENCE BOOKS:

1. "N. K. Sinha", "Control Systems", New Age International (P) Limited Publishers, 3rd Edition, 1998.
2. "NISE", "Control Systems Engineering", John wiley, 6th Edition, 2011.
   "Katsuhiko Ogata", "Modern Control Engineering", Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

II Year B.Tech ECE-II Sem **L /T/ P / C**
3 / 1/ 0 / 4

(1804PC07) PROBABILITY THEORY AND STOCHASTIC PROCESS

OBJECTIVES:
The main objectives of the course are:
1. To provide mathematical background and sufficient experience so that student can read, write and understand sentences in the language of probability theory.
2. To introduce students to the basic methodology of "probabilistic thinking" and apply it to problems.
3. To understand basic concepts of Probability theory and Random Variables, how to deal with multiple Random Variables.
4. To understand the difference between time averages statistical averages.
5. To teach students how to apply sums and integrals to compute probabilities, and expectations.

OUTCOMES:
After completion of the course, the student will be able to:
1. Understand probabilities and able to Analyze and Solve problems involving probability calculations, including joint, marginal, and conditional probabilities.
2. Analyze random variables and apply different probability distributions(Binomial, Poisson, Uniform, Exponential Gaussian, Rayleigh) to model real-world situations.
3. Calculate and interpret the expected value and variance of discrete and continuous random variables.
4. Evaluate time averages, ergodicity and able to compute and interpret auto correlation and cross-correlation functions, as well as covariance functions.
5. Understand the relationship between the power spectrum density and the correlation function and be able to evaluate the power density spectrum along with its properties.
6. Connect the knowledge of mean values, auto correlation, cross-correlation, power density spectra, and cross power spectral densities to evaluate and optimize the performance of linear systems in practical applications.

UNIT I:
Probability and Random Variable
Probability: Set theory, Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Mathematical Model of Experiments, Joint Probability, Conditional Probability, Total Probability, Bayes' Theorem, and Independent Events.

The Random Variable: Definition of a Random Variable, Conditions for a Function to be a Random Variable, Discrete and Continuous, Mixed Random Variable

UNIT II:

Distribution and Density Functions-Operations on One Random Variable

Distribution and density functions: Distribution and Density functions, Properties, Binomial, Poisson, Uniform, Exponential Gaussian, Rayleigh and Conditional Distribution, Methods of defining Conditioning Event, Conditional Density function and its properties, problems.

Operation on One Random Variable: Expected value of a random variable, function of a random variable, moments about the origin, central moments, variance and skew, characteristic function, moment generating function.

UNIT III:

Multiple Random Variables and Operations on Multiple Random Variables

Multiple Random Variables: Vector Random Variables, Joint Distribution Function and Properties, Joint density Function and Properties, Marginal Distribution and density Functions, conditional Distribution and density Functions, Statistical Independence, Distribution and density functions of Sum of Two Random Variables and Sum of Several Random Variables, Central Limit Theorem - Unequal Distribution, Equal Distributions.

Operations on Multiple Random Variables: Expected Value of a Function of Random Variables, Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, and Jointly Gaussian Random Variables: Two Random Variables case and N Random Variable case, Properties.

UNIT IV:

Stochastic Processes-Temporal Characteristics

The Stochastic process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, Statistical Independence and concept of Stationarity: First-Order Stationary Processes, Second-Order and Wide-Sense Stationarity, Nth-Order and Strict-Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes Autocorrelation Function and Its Properties, Cross-Correlation--Function and Its Properties, Covariance Functions and its properties, Gaussian Random Processes.

Linear system Response: Mean and Mean-squared value, Autocorrelation, Cross-Correlation Functions.

UNIT V:

Stochastic Processes-Spectral Characteristics

The Power Spectrum and its Properties, Relationship between Power Spectrum and Autocorrelation Function, the Cross-Power Density Spectrum and Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function.

Spectral characteristics of system response: power density spectrum of response, cross power spectral density of input and output of a linear system

TEXT BOOKS:

1. Probability, Random Variables & Random Signal Principles -Peyton Z. Peebles, TMH, 4th Edition, 2001.
2. Probability and Random Processes-Scott Miller, Donald Childers,2Ed,Elsevier,2012

REFERENCE BOOKS:

1. Theory of probability and Stochastic Processes-Pradeep Kumar Gosh, University Press

2. Probability and Random Processes with Application to Signal Processing - Henry Stark and John W. Woods, Pearson Education, 3rd Edition.
3. Probability Methods of Signal and System Analysis- George R. Cooper, Clave D. MC Gillem, Oxford, 3rd Edition, 1999.
4. Statistical Theory of Communication -S.P. Eugene Xavier, New Age Publications 2003
5. Probability, Random Variables and Stochastic Processes Athanasios Papoulis and S.Unnikrishna Pillai, PHI, 4th Edition, 2002.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

II Year B.Tech ECE-II Sem **L/ T/ P/ C**
0 / 0/ 3/ 1.5

(1804PC63) ANALOG CIRCUITS LAB

COURSE OUTCOMES

1. Examine, the frequency response of BJT amplifiers.
2. Examine, the frequency response of FET amplifiers.
3. Understand the working of Push Pull amplifier & different configurations of feedback amplifier
4. Design and Analyze different types of oscillators
5. Analyze and realize different classes of Power Amplifiers.
6. Evaluate the performance of Tuned amplifiers and estimate the resonant frequency useable for audio and Radio applications
7.

Note:

- Minimum 12 experiments should be conducted:
- Experiments are to be simulated using Multisim or P-spice or Equivalent Simulation and then testing to be done in hardware.

LIST OF EXPERIMENTS:

1. Common Emitter Amplifier
2. Common Base Amplifier
3. Common Source amplifier
4. Two Stage RC Coupled Amplifier
5. Current Shunt Feedback Amplifier
6. Voltage Series Feedback Amplifier
7. Cascode Amplifier
8. Wien Bridge Oscillator using Transistors
9. RC Phase Shift Oscillator using Transistors
10. Class A Power Amplifier (Transformer less)
11. Class B Complementary Symmetry Amplifier
12. Hartley Oscillator
13. Colpitt's Oscillator
14. Single Tuned Voltage Amplifier

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

II Year B.Tech ECE-II Sem **L/T/ P/ C**
0 /0/ 3/ 1.5

(1804PC64) ANALOG & DIGITAL COMMUNICATIONS LAB

COURSE OUTCOMES

1. Design and Implementation of different analog modulation and demodulation techniques
2. Apply Time Division Multiplexing concepts in different pulse modulation techniques
3. Demonstrate the ability to generate PCM signals from analog signals
4. Describe Practical Implementation of base band modulation techniques
5. Design and Implement different Pulse Modulation Techniques
6. Analyzing Digital Modulation techniques

Part-1: ANALOG COMMUNICATIONS (Any 8 Experiments)

1. Amplitude modulation and demodulation.
2. DSB-SC Modulator & Detector
3. SSB-SC Modulator & Detector (Phase Shift Method)
4. Frequency modulation and demodulation.
5. Study of spectrum analyzer and analysis of AM and FM Signals
6. Pre-emphasis & de-emphasis.
7. Verification of Sampling Theorem
8. Pulse Amplitude Modulation & Demodulation
9. Pulse Width Modulation & Demodulation
10. Pulse Position Modulation & Demodulation

Part-2: DIGITAL COMMUNICATIONS (Any 6 Experiments)

1. PCM Generation and Detection
2. Differential Pulse Code Modulation
3. Delta Modulation
4. Adaptive Delta modulation
5. Frequency Shift Keying: Generation and Detection
6. Phase Shift Keying: Generation and Detection
7. Amplitude Shift Keying: Generation and Detection
8. OFDM: Generation and Detection

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution- UGC, Govt. of India)

II Year B.Tech ECE-II Sem **L/ T/ P /C**
2 / 0/ 0 / 0

(1800MC02) HUMAN VALUES AND PROFESSIONAL ETHICS

Course Objective: To enable the students to imbibe and internalize the Values and Ethical Behaviour in the personal and Professional lives.

Course Outcome:

1. Evaluate the concepts of human values, including self-exploration and natural acceptance, and assess their role in fostering happiness and prosperity as fundamental human aspirations..
2. Analyze the principles of harmony in family and society, including values such as trust and respect, and develop strategies to promote a harmonious, universally unified society.
3. Differentiate between personal and professional ethics, including ethical dilemmas, and apply concepts of life skills and emotional intelligence to navigate ethical decisions in a professional context.
4. Interpret the ethical responsibilities and moral values in engineering practices by examining real-world case studies, and evaluate the impact of professional codes of conduct on workplace norms and accountability
5. Analyzation of global ethical issues, including sustainable development, technology globalization, and corporate governance, and propose solutions to address these challenges in a professional setting
6. Assess the ethical implications of emerging global concerns—such as media, war, and bioethics—and develop frameworks for ethical decision-making regarding intellectual property rights and environmental sustainability.

UNIT - I: Introduction to Human Values: Need, basic Guidelines, Content and Process for Value Education, Self Exploration - 'Natural Acceptance' and Experiential Validation. Continuous Happiness and Prosperity - A look at basic Human Aspirations. Right understanding, Relationship and Physical Facilities. Understanding Happiness and Prosperity correctly

UNIT - II: Understanding Harmony in the Family and Society: Harmony in Human - Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human - human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship. Understanding the harmony in the society (society being an extension of family). Visualizing a universal harmonious order in society - Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) - from family to world family!

UNIT – III:Introduction to Professional Ethics: Basic Concepts, Governing Ethics, Personal & Professional Ethics, Ethical Dilemmas, Life Skills, Emotional Intelligence, Thoughts of Ethics, Value Education, Dimensions of Ethics, Profession and professionalism, Professional Associations, Professional Risks, Professional Accountabilities, Professional Success, Ethics and Profession.

UNIT – IV:Professional Practices in Engineering: Work Place Rights & Responsibilities, Professions and Norms of Professional Conduct, Norms of Professional Conduct vs. Profession; Responsibilities, Obligations and Moral Values in Professional Ethics, Professional codes of ethics, the limits of predictability and responsibilities of the engineering profession. Central Responsibilities of Engineers – The Centrality of Responsibilities of Professional Ethics; lessons from 1979 American Airlines DC-10 Crash and Kansas City Hyatt Regency Walk away Collapse.

UNIT – V:Global issues in Professional Ethics: Introduction – Current Scenario, Technology Globalization of MNCs, International Trade, World Summits, Issues, Business Ethics and Corporate Governance, Sustainable Development Ecosystem, Energy Concerns, Ozone Depletion, Pollution, Ethics in Manufacturing and Marketing, Media Ethics, War Ethics, Bio Ethics, Intellectual Property Rights.

TEXT BOOKS:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Professional Ethics: R. Subramanian, Oxford University Press, 2015.

REFERENCE BOOKS:

1. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.
2. Ethics in Engineering Practice & Research, Caroline Whitbeck, 2e, Cambridge University Press 2015.
3. Ivan IIIich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
4. Engineering Ethics, Concepts Cases: Charles E Harris Jr., Michael S Pritchard, Michael J Rabins, 4e , Cengage learning, 2015.
5. Business Ethics concepts & Cases: Manuel G Velasquez, 6e, PHI, 2008.

ECE

SYLLABUS

B.Tech - III YEAR

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

B.Tech. III Year I Sem. **L / T/ P/ C**
3/ 0 / 0/ 3

(1800HS04) MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS

OBJECTIVES:

To enable the student to understand and appreciate, with a particular insight, the importance of certain basic issues governing the business operations namely, demand and supply, production function, cost analysis, markets, forms of business organizations, capital budgeting and financial accounting and financial analysis.

OUTCOMES:

At the end of the course, the student will

1. Understand the basic aspects of managerial economics including the nature and scope of demand analysis, the various determinants of demand, elasticity of demand, and demand forecasting.
2. Assess production and cost concepts such as production function, laws of returns to scale, and be able to perform break-even analysis for effectiveness in the choice of production and cost minimization strategies.
3. Analyze among the three broad categories of business competition (perfect competition, monopoly and monopolistic competition) as well as pricing mechanisms and their applicability within the different business contexts.
4. Applying capital budgeting mets that include the Payback Period, ARR, and NPV to evaluate the feasibility of the proposed capital investment projects.
5. Applying financial statements including the Trading Account, Profit and Loss Account and the Balance Sheet through the relevant accounting concepts to evaluate an organization's position.
6. Analyze financial data using cash flow and fund flow techniques in evaluating the operational position and performance of a firm for effective policy formulation.

.

Unit I: Introduction & Demand Analysis: Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

Unit II: Production & Cost Analysis: Production Function - MRTS, Least Cost Combination of Inputs, Laws of Returns to Scale, Internal and External Economies of Scale. Cost Analysis: Cost concepts. Break-even Analysis (BEA) - Determination of Break-Even Point (simple problems).

Unit III: Markets & New Economic Environment: Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition, Pricing: Objectives and Policies of Pricing, Methods of Pricing, Business: Features and evaluation of different forms of Business Organization, Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, New Economic Environment, Changing Business Environment in

Post-liberalization scenario.

Unit IV: Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital, Capital Budget, Cash Budget, Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting, Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

Unit V: Introduction to Financial Accounting & Financial Analysis: Accounting concepts and Conventions - Double Entry - Book Keeping, Journal, Ledger, Trial Balance - Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments), Financial Statement Analysis: cash flow & Funds flow statements (simple problems).

TEXT BOOKS:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.
2. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age international Publishers, Hyderabad 2013.
3. M. Kasi Reddy & Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi, 2012.

REFERENCES:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi, 2012.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson, 2012.
3. Lipsey & Chrystel, Economics, Oxford University Press, 2012.
4. Domnick Salvatore: Managerial Economics In a Global Economy, Thomson, 2012.
5. Narayanaswamy: Financial Accounting - A Managerial Perspective, Pearson, 2012.
6. S.N. Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2012.
7. Truet and Truet: Managerial Economics: Analysis, Problems and Cases, Wiley, 2012.
8. Dwivedi: Managerial Economics, Vikas, 2012.
9. Shailaja & Usha: MEFA, University Press, 2012.
10. Aryasri: Managerial Economics and Financial Analysis, TMH, 2012.
11. Vijay Kumar & Appa Rao, Managerial Economics & Financial Analysis, Cengage 2011.
12. J.V. Prabhakar Rao & P.V. Rao, Managerial Economics & Financial Analysis, Maruthi Publishers, 2011.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

III Year B.Tech ECE-I Sem **L / T / P /C**
2 / 1 / 0 / 3

(1800HS06) PROFESSIONAL ENGLISH

INTRODUCTION:

English is a tool for global communication and is the dominant language which is sweeping almost all the fields in the world. It has become a necessity for people to speak in English comfortably, if they want to enter the global workforce. Hence, the course is designed to help the students to meet the global standards. Each unit focuses on English skill-set to improve: Interview skills, giving presentations and professional etiquette.

OBJECTIVES:

1. To enrich students to express themselves appropriately and fluently in professional contexts.
2. To enhance their employability through regular participation in group discussions and interview skills.
3. To lay foundation with writing strategies for the future work place needs.
4. To acquaint students with different components of professional presentation skills.
5. To equip students with necessary training in listening to comprehend dialects of English language.

OUTCOMES:

Students will be able to:

1. Draft coherent and unified paragraphs with adequate supporting details.
2. Demonstrate problem solving skills, decision-making skills, analytical skills.
3. Comprehend and apply the pre-interview preparation techniques for successful interview.
4. Achieve expertise in writing resume and cover letter formats.
5. Understand the steps of writing 'Reports and Abstract'.
6. Understand and express simple narratives, descriptions and day to day conversations.

UNIT I : FOCUS ON LANGUAGE

Parts of speech - nominal compounds, noun phrases - relative pronoun - adjective - numerical, comparison and contrast, collocation and word combinations - verb - preposition and relative - conjunction- connectives, expressions of purpose and function, cause and effect - articles - adjectives - sentence pattern - tenses - voice - rewriting the sentences in impersonal/abbreviated passive grammatical structures - concord - sentence level verb noun agreement - gerund - rewriting infinitive into gerund - imperative - rewriting imperative into recommendation using should - word formation - varied grammatical function of the same word - affixes - prefixand suffix, number prefix, negative prefix - reported speech - editing strategies - conditional structures - real, unreal, no possibility, zero condition.

writing formal definition - abbreviation and acronym - idioms and phrases ,varieties of English - British versus American.

UNIT II : LISTENING SKILLS

Comprehension practice - vocabulary development - familiarity to varied types of spoken English and accents - developing ability to understand audio and video media - aiming at overcoming barriers to listening - listening to documentaries, radio news broadcasts, TV news telecasts - active listening in discussions and to lectures - taking notes while listening - extracting information from listening.

UNIT III: SPEAKING SKILLS

Oral practice - role play - interplay - seminar - transcoding visual into oral - participating in short and longer conversation - voice record, replay, correction of intonation, pronunciation and flow of speech - phonemes - vowels, consonants, stress, rhythm, intonation - group discussion - participative learning - acquiring proficiency, fluency, accuracy in oral communication - speaking practice - developing confidence - extempore speech - learning professional/conversational etiquette – Oral presentation skills.

UNIT IV : READING SKILLS

Vocabulary extension - improving vocabulary - intensive reading - reading strategies - identifying topic sentence - guessing meaning from content - picking out specific information - professional reading - reading practice - predicting the content, critical and analytical reading - reading articles in English newspapers, sports magazines, encyclopedias - reading aloud, use of stress and intonation - reading and comprehending technical materials - cloze reading.

UNIT V : WRITING SKILLS

Discourse cohesion - improving writing skills, avoiding common grammatical errors in academic writing - extending the hints - writing shorter sentences - punctuation - dialogue writing - paragraph writing, problems and solutions, achieving coherence, transition words, sequence words - essays of descriptive and argumentative - writing instructions, use of imperatives - jumbled sentences into sequential paragraph using linguistic clues - report writing - technical reports, industry visit reports, events reports - writing recommendations - letter writing - formal and informal letters, e-mail writing - job application and resume, permission for in-plant training, business correspondence letters, calling for quotation, placing order, lodging complaint, persuasive letters - assignment writing - mini-project –telephonic etiquette-transcoding - transferring of information from text to pictorial/graphical representation and vice versa.

* Exercises apart from the text book shall also be referred for classroom tasks.

TEXT BOOKS:

1. Practical English Usage. Michael Swan. OUP.1995.
2. Remedial English Grammar. F.T. Wood.Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book.2001

REFERENCE BOOKS:

1. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press.2006.
2. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press.2011.
3. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

III Year B.Tech ECE-I Sem **L / T / P /C**
3 / 0 / 0 / 3

(1804PC08) DIGITAL SYSTEM DESIGN

Course Objectives:

- To understand common forms of number representation in logic circuits
- To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
- To understand the concepts of combinational logic circuits and sequential circuits.
- To understand the Realization of Logic Gates Using Diodes & Transistors.

Course Outcomes: Upon completing this course, the student will be able to

1. Understand the numerical information in different forms and Boolean Algebra theorems
2. Postulates of Boolean algebra and to minimize combinational functions
3. Analyze combinational circuits
4. Analyze and sequential circuits
5. Analyze finite state machines
6. Known about the logic families and realization of logic gates

UNIT - I:

Number Systems: Number systems, Complements of Numbers, Codes- Weighted and Non-weighted codes and its Properties, Parity check code and Hamming code.

Boolean Algebra: Basic Theorems and Properties, Switching Functions- Canonical and Standard Form, Algebraic Simplification, Digital Logic Gates, EX-OR gates, Universal Gates, Multilevel NAND/NOR realizations.

UNIT - II:

Minimization of Boolean functions: Karnaugh Map Method - Up to five Variables, Don't Care Map Entries, Tabular Method,

Combinational Logic Circuits: Adders, Subtractors, Comparators, Multiplexers, Demultiplexers, Encoders, Decoders and Code converters, Hazards and Hazard Free Relations.

UNIT – III:

Sequential Circuits Fundamentals: Basic Architectural Distinctions between Combinational and Sequential circuits, SR Latch, Flip Flops: SR, JK, JK Master Slave, D and T Type Flip Flops, Excitation Table of all Flip Flops, Timing and Triggering Consideration, Conversion from one type of Flip-Flop to another.

Registers and Counters: Shift Registers – Left, Right and Bidirectional Shift Registers, Applications of Shift Registers - Design and Operation of Ring and Twisted Ring Counter, Operation of Asynchronous and Synchronous Counters.

UNIT – IV:

Sequential Machines: Finite State Machines, Synthesis of Synchronous Sequential Circuits- Serial Binary Adder, Sequence Detector, Parity-bit Generator, Synchronous Modulo N –Counters. Finite state machine-capabilities and limitations, Mealy and Moore models.

UNIT – V:

Realization of Logic Gates Using Diodes & Transistors: AND, OR and NOT Gates using Diodes and Transistors, DCTL, RTL, DTL, TTL, CML and CMOS Logic Families and its Comparison, Classification of Integrated circuits, comparison of various logic families, standard TTL NAND Gate- Analysis & characteristics, TTL open collector O/Ps, Tristate TTL, MOS & CMOS open drain and tri- state outputs, CMOS transmission gate, IC interfacing- TTL driving CMOS & CMOS driving TTL.

TEXT BOOKS:

1. Switching and Finite Automata Theory - Zvi Kohavi & Niraj K. Jha, 3rd Edition, Cambridge, 2010.
2. Modern Digital Electronics – R. P. Jain, 3rd Edition, 2007- Tata McGraw-Hill

REFERENCE BOOKS:

1. Digital Design- Morris Mano, PHI, 4th Edition,2006
2. Introduction to Switching Theory and Logic Design – Fredriac J. Hill, Gerald R. Peterson, 3rd Ed, John Wiley & Sons Inc.
3. Fundamentals of Logic Design- Charles H. Roth, Cengage Learning, 5th, Edition, 2004.
4. Switching Theory and Logic Design – A Anand Kumar, PHI, 2013

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

III Year B.Tech ECE-I Sem **L / T / P /C**
3 / 0 / 0 / 3

(1804PC09) LINEAR & DIGITAL IC APPLICATIONS

Course Objectives:

The main objectives of the course are:

1. To introduce the basic building blocks of linear integrated circuits.
2. To teach the linear and non - linear applications of operational amplifiers.
3. To introduce the theory and applications of analog multipliers and PLL.
4. To teach the theory of ADC and DAC.
5. To introduce the concepts of waveform generation and introduce some special function ICs.
6. To understand and implement the working of basic digital circuits

Course Outcomes:

On completion of this course, the students will have

1. Understand the basic concepts of integrated circuits and operational amplifiers.
2. Design OP- Amp circuits for different applications.
3. Design and analyze the filters and oscillators using OP- Amp
4. Discuss various applications of special functions of ICs such as 555, voltage Regulators and PLL applications.
5. Analyze Various types of ADC and DAC
6. Choose the proper LDICs by knowing their characteristics

UNIT - I: Operational Amplifier

Operational Amplifier: Ideal and Practical Op-Amp, Op-Amp Characteristics, DC and AC Characteristics, Features of 741 Op-Amp, Modes of Operation - Inverting, Non-Inverting, Differential, Instrumentation Amplifier, AC Amplifier, Differentiators and Integrators, Comparators, Schmitt Trigger, Introduction to Voltage Regulators, Features of 723 Regulator, Three Terminal Voltage Regulators.**Active Filters:** Analysis and Design of 1st order Low Pass and High Pass Butterworth Filters.

UNIT - II:Op-Amp, IC-555 & IC 565 Applications

Op-Amp, IC-555 & IC 565 Applications: Introduction to Active Filters, Characteristics of Band pass, Band reject and All Pass Filters, Analysis of 1st order LPF & HPF Butterworth Filters, Waveform Generators – Triangular, Saw tooth, Square Wave, IC555 Timer - Functional Diagram, Monostable, and Astable Operations, Applications, IC565 PLL - Block Schematic, Description of Individual Blocks, Applications.

UNIT - III: Data Converters

Data Converters: Introduction, Basic DAC techniques, Different types of DACs-Weighted resistor DAC, R-2R ladder DAC, Inverted R-2R DAC, Different Types of ADCs - Parallel Comparator Type ADC, Counter Type ADC, Successive Approximation ADC and Dual Slope ADC, DAC and ADC Specifications.

UNIT - IV:Digital Integrated Circuits

Digital Integrated Circuits: Classification of Integrated Circuits, Comparison of Various Logic Families Combinational Logic ICs – Specifications and Applications of TTL-74XX & Code Converters, Decoders, Demultiplexers, LED & LCD Decoders with Drivers, Encoders, Priority Encoders, Multiplexers, Demultiplexers, Priority Generators/Checkers, Parallel Binar Adder/Subtractor, Magnitude Comparators.

UNIT - V: Sequential Logic IC's and Memories

Sequential Logic IC's and Memories: Familiarity with commonly available 74XX & CMOS 40XX Series ICs – All Types of Flip-flops, 74LS279A-Set-Reset Latch,Synchronous Counters, Decade Counters, Shift Registers.Memories - ROM Architecture, Types of ROMS & Applications, RAM Architecture, Static & Dynamic RAMs.PLA, PAL, PGA, Sequential programmable logic devices

TEXT BOOKS:

1. Op-Amps & Linear ICs – Ramakanth A. Gayakwad, PHI, 2003.
2. Digital Fundamentals – Floyd and Jain, Pearson Education, 8th Edition, 2005.

REFERENCE BOOKS:

1. Linear Integrated Circuits –D. Roy Chowdhury, New Age International (p) Ltd, 2nd Ed., 2003.
2. Op Amps and Linear Integrated Circuits-Concepts and Applications James M. Fiore, Cengage Learning/ Jaico, 2009.
3. Operational Amplifiers with Linear Integrated Circuits by K. Lal Kishore – Pearson, 2009.
4. Linear Integrated Circuits and Applications – Salivahanan, MC GRAW HILL EDUCATION.
5. Modern Digital Electronics – RP Jain – 4/e – MC GRAW HILL EDUCATION, 2010.
6. Digital System Design Using VHDL – Charles H Roth, Jr. Thomson, 1998.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution- UGC, Govt. of India)

III Year B.Tech ECE-I Sem **L /T / P/ C**
0 / 0 / 3/ 1.5

(1804PC65) DIGITAL SYSTEM DESIGN LAB

Course Objectives:

1. To enable the students to implement the digital circuits using logic gates
2. To know the concepts of Combinational circuits
3. To understand the components of Flip-flops, Registers & Counters.

Course Outcomes:

1. Able to demonstrate the digital circuits using Logic Gates.
2. Able to identify the various digital IC's and understand their operation.
3. Able to Design Simple logic Circuits..
4. Able to Design the combinational circuits
5. Able to understand the operation and design of sequential circuits
6. Able to design finite state machines circuits

LIST OF EXPERIMENTS

1. Study of logic gates.
2. Design and implementation of adders and subtractors
3. Design and implementation of priority Encoder
4. Design and implementation of 3 to 8 Decoder
5. Design a 4 –bit Gray to Binary and Binary to Gray Converter.
6. Design a 450 KHz clock using NAND / NOR gates.
7. Study of by IC's using Universal IC Trainer Kit
8. Design a 16 x 1 multiplexer using 8 x 1 multiplexer.
9. Verification of state tables of RS, JK, T and D flip-flops using NAND & NOR gates.
10. Implementation of SISO
11. Implementation of PLSO.
12. Design a 4 bit Comparator.
13. Design and Implement a Decade counter.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution- UGC, Govt. of India)

III Year B.Tech ECE-I Sem **L / T / P/ C**
0 / 0 / 3 / 1.5

(1804PC66) LINEAR & DIGITAL IC APPLICATIONS LAB

Course Objectives:

The main objectives of this course are to

1. To understand the linear and non-linear applications of operational amplifiers (741).
2. To get familiarity with theory and applications of 555 timers.
3. To understand the design the different types of counter designing
4. To understand the design various applications using 7 segment display

Course Outcomes:

1. Upon completion of the course, student should possess the following :
2. Design different applications using IC 741
3. Analyze different 3 terminal voltage regulators and design voltage regulators using IC 723
4. Design Multivibrator using IC 555
5. Design PLL circuits using IC 565
6. Design different applications using digital ICs
7. Design & Implement ADC and DAC Circuits

LIST OF EXPERIMENTS

1. Inverting and Non-inverting Amplifiers using Op Amps.
2. Adder and Subtractor using Op Amp.
3. Integrator and Differentiator circuits using Op Amp.
4. Active Filter Applications – LPF, HPF (first order)
5. Design of Schmitt trigger using IC 741 Op Amp.
6. Mono-stable Multivibrator using IC 555.
7. Astable Multivibrator using IC 555.
8. IC 565 – PLL Applications.
9. Voltage Regulator using IC 723.
10. Plot the transform Characteristics of 74H, LS, HS series IC's.
11. Design a model to 53 counter using two decade counters.
12. Design a two Digit 7 segment display unit using this display the Mod counter output of experiment 11
13. Design a 4 bit pseudo random sequence generator using 4 – bit ring counter.
14. Design a Ring counter and Twisted ring counter using a 4-bit shift register
15. Design a 4 digit hex counter using synchronous one digit hex counters.
16. Design a 4 digit hex counter using Asynchronous one digit hex counters.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution- UGC, Govt. of India)

III Year B.Tech ECE-I Sem **L /T / P/ C**
2 / 0 / 0 / 0

(1800MC04) INDIAN CONSTITUTION
(Mandatory Course)

Course Objective:

To enable the students to be aware of emergence and evolution of Indian Constitution,to understand their fundamental rights and duties and to understand the structure and composition of Election Commission.

Course Outcome:

1. Understand the meaning, importance, and evolution of the Indian Constitution and identify its salient features
2. Describe the scheme of Fundamental Rights, Duties, and Directive Principles of State Policy, and analyze their legal and societal significance
3. Illustrate the structure of the Union Government, including the roles and powers of the President, Prime Minister, and Parliament.
4. Examine the historical perspective of constitutional amendments and evaluate the significance of emergency provisions in India.
5. Analyze the constitutional framework for local self-government and assess its role in grassroots governance
6. Understand the functioning of the Election Commission, State Election Commissions, and welfare institutions for SC/ST/OBC and women

UNIT –I Meaning and Importance of Constitution, Evolution of the constitution of India. Salient features of the constitution of India

UNIT –II Scheme of fundamental rights, fundamental duties and its legal status. The Directive Principles of State Policy- Significance and implementation

UNIT –III Government of the Union : President of India – Election and Powers, Prime Minister and Council of Ministers, Lok Sabha – Composition and Powers, Rajya Sabha – Composition and Powers

UNIT –IV The historical perspectives of the constitutional amendments in India. Emergency provisions: National Emergency, President Rule, Financial Emergency, Local self-government-Constitutional scheme in India

UNIT –V Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ST/OBC and women.

TEXTBOOKS:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.

REFERENCES:

1. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015
2. ‘Indian Administration’ by Avasti and Avasti

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

III Year B.Tech ECE-I Sem **L / T / P /C**
3 / 0 / 0 / 3

(1804PE01) ANTENNAS AND WAVE PROPAGATION

(Professional Elective – I)

Course Objectives:

The main objectives are:

1. Understand basic terminology and concepts of Antennas.
2. To attain knowledge on the basic parameters those are considered in the antenna design process and the analysis while designing that.
3. Analyze the electric and magnetic field emission from various basic antennas and mathematical formulation of the analysis.
4. To have knowledge on antenna operation and types as well as their usage in real time field.
5. Aware of the wave spectrum and respective band antenna usage and also to know the propagation of the waves at different frequencies through different layers in the existing layered free space environment structure.

Course Outcomes:

Student will be:

1. Explain the radiation through antenna and identify different types of antennas.
2. Identify and measure the basic antenna parameters.
3. Design and analyze Very high frequency AND Ultra high frequency Antennas.
4. Design and analyze antenna arrays.
5. Design the bench setup for antenna parameters measurement.
6. Identify the characteristics of radio-wave propagation.

UNIT- I:Antenna Basics &Thin Linear Wire Antennas

Antenna Basics: Introduction, Basic Antenna Parameters - Patterns, Beam Area, Radiation Intensity, Beam Efficiency, Directivty- Gain- Resolution, Antenna Apertures, Effective Height. Related Problems.

Thin Linear Wire Antennas: Radiation from Small Electric Dipole, Quarter wave Mono pole and Half wave Dipole – Current Distributions, Field Components, Radiated Power, Radiation Resistance, Beam widths, Directivity, Effective Area and Effective Height. Natural current distributions, fields and patterns of Thin Linear Center-fed Antennas of Different Lengths, Illustrative Problems. Loop Antennas - Introduction, Small Loop, Comparison of Far Fields of Small Loop and Short Dipole, Radiation Resistances and Directivities of Small and Large Loops (Qualitative Treatment).

UNIT - II: VHF, UHF AND Microwave Antennas - I

VHF, UHF AND Microwave Antennas - I: Arrays with Parasitic Elements, Yagi - Uda Arrays, Folded Dipoles & their characteristics, Helical Antennas - Helical geometry, Helix Modes, Practical Design Considerations for Monofilar Helical Antenna in Axial and Normal Modes. Horn Antennas - Types, Fermat's Principle, Optimum Horns, Design Considerations of Pyramidal Horns, Illustrative Problems.

UNIT - III:VHF, UHF ,Microwave Antennas & Lens Antennas- II

VHF, UHF AND Microwave Antennas - II: Micro strip Antennas - Introduction, Features, Advantages and Limitations, Rectangular Patch Antennas - Geometry and Parameters, Characteristics of Micro strip Antennas. Impact of Different Parameters on Characteristics, Reflector Antennas - Introduction, FlatSheet and Corner Reflectors, Paraboloidal Reflectors - Geometry, Pattern Characteristics, Feed Methods, Reflector Types - Related Features, Illustrative Problems. Lens Antennas - Introduction, Geometry of Non-metallic Dielectric Lenses, Zoning, Tolerances, Applications.

UNIT - IV:Antenna Arrays &Antenna Measurements

Antenna Arrays: Point Sources - Definition, Pattern, arrays of 2 Isotropic Sources - Different Cases, Principle of Pattern Multiplication, Uniform Linear Arrays - Broadside Arrays, End fire Arrays, EFA with Increased Directivity, Derivation of their Characteristics and Comparison, BSAs with Non-unitform Amplitude Distributions - General Considerations and Binomial Arrays, Illustrative Problems.

Antenna Measurements: Introduction, Concepts - Reciprocity, Near and Far Fields, Coordinate System, Sources of Errors. Patterns to be Measured, Pattern Measurement Arrangement, Directivity Measurement, Gain Measurements (by Comparison, Absolute and 3-Antenna Methods)

UNIT - V: Wave Propagation - I & Wave Propagation - II

Wave Propagation - I: Introduction, Definitions, Categorizations and General Classifications, Different Modes of Wave Propagation, Ray/Mode Concepts, Ground Wave Propagation (Quantitative Treatment) - Introduction, Plane Earth Reflections, Space and Surface Waves, Wave Tilt, Curved Earth Reflections, Space Wave Propagation - Introduction, Field Strength Variation with Distance and Height, Effect of Earth's Curvature, Absorption, Super retraction, M-Curves and Duct Propagation, Scattering Phenomena, Tropospheric Propagation.

Wave Propagation - II: Sky Wave Propagation - Introduction, Structure of Ionosphere, Refraction and Reflection of Sky Waves by Ionosphere, Ray Path, Critical Frequency, MUF, LUF, OF, Virtual Height and Skip Distance, Relation between MUF and skip Distance, Multi-hop Propagation.

TEXT BOOKS:

1. Antennas for All Applications – John D. Kraus and R. J. Marhefka, and Ahmad S. Khan TMH, New Delhi, 4th ed., (Special Indian Edition) 2010.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd ed., 2000.

REFERENCE BOOKS:

1. Antenna Theory - C.A. Balanis, John Wiley & Sons, 3rd ed., 2005.
2. Antennas and Wave Propagation – K.D. Prasad, Satya Prakashan, Tech India Publications, New Delhi, 2001.
3. Transmission and Propagation – E.V.D. Glazier and H.R.L. Lamont, The Services Text Book of Radio, vol. 5, Standard Publishers Distributors, Delhi.
4. Electronic and Radio Engineering – F.E. Terman, McGraw-Hill, 4th edition, 1955.
5. Antennas – John D. Kraus, McGraw-Hill (International Edition), 2nd Ed. 1988.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

III Year B.Tech ECE-I Sem **L / T / P /C**
3 / 0 / 0 / 3

(1804PE02) ERROR CORRECTING CODES

(Professional Elective – I)

Course Objectives:

The main objectives are:

1. To understand the need for source and channel coding.
2. To study various source and channel coding techniques.
3. This course introduces how various coding takes place in communication.
4. It also introduces different entropies, channel capacity and purpose of encoding.
5. To understand the Fundamental Limits in Information Theory.

Course Outcomes:

Student will be:

1. Explain the fundamental concepts of information theory, including logarithmic measures, mutual information, and entropy, as applied to reliable digital transmission and storage.
2. Analyze the error detection and correction capabilities of linear block codes, cyclic codes, and convolutional codes using mathematical models..
3. Apply the concepts of Hamming codes, cyclic redundancy checks, and convolutional codes to design error control strategies for data storage and transmission systems..
4. Evaluate the performance of turbo codes, LDPC codes, and product codes in terms of their decoding efficiency and error correction capabilities.
5. Design and simulate space-time block codes, such as Alamouti's scheme and BLAST, to achieve diversity and performance improvements in wireless communication systems.
6. Demonstrate the ability to work collaboratively on implementing coding strategies for error control and improving transmission reliability.

UNIT – I: Coding for Reliable Digital Transmission and storage:

Mathematical model of Information, A Logarithmic Measure of Information, Average and Mutual Information and Entropy, Types of Errors, Error Control Strategies. Linear Block Codes: Introduction to Linear Block Codes, Syndrome and Error Detection, Minimum Distance of a Block code, Error-Detecting and Error-correcting Capabilities of a Block code, Standard array and Syndrome Decoding, Probability of an undetected error for Linear Codes over a BSC, Hamming Codes. Applications of Block codes for Error control in data storage system

UNIT – II : Cyclic Codes :

Description, Generator and Parity-check Matrices, Encoding, Syndrome Computation and Error Detection, Decoding ,Cyclic Hamming Codes, Shortened cyclic codes, Error-trapping decoding

for cyclic codes, Majority logic decoding for cyclic codes.

UNIT – III : Convolutional Codes:

Encoding of Convolutional Codes, Structural and Distance Properties, maximum likelihood decoding, Sequential decoding, Majority- logic decoding of Convolution codes. Application of Viterbi Decoding and Sequential Decoding, Applications of Convolutional codes in ARQ system.

UNIT – IV : Turbo Codes:

LDPC Codes- Codes based on sparse graphs, Decoding for binary erasure channel, Log-likelihood algebra, Brief propagation, Product codes, Iterative decoding of product codes, Concatenated convolutional codes- Parallel concatenation, The UMTS Turbo code, Serial concatenation, Parallel concatenation, Turbo decoding

UNIT – V : Space-Time Codes:

Introduction, Digital modulation schemes, Diversity, Orthogonal space- Time Block codes, Alamouti's schemes, Extension to more than Two Transmit Antennas, Simulation Results, Spatial Multiplexing : General Concept, Iterative APP Preprocessing and Per-layer Decoding, Linear Multi-layer Detection, Original BLAST Detection, QL Decomposition and Interface Cancellation, Performance of Multi – Layer Detection Schemes, Unified Description by Linear Dispersion Codes.

TEXT BOOKS:

1. Shu Lin, Daniel J.Costello,Jr, "Error Control Coding- Fundamentals and Applications", Prentice Hall, Inc.
2. Man Young Rhee, "Error Correcting Coding Theory", 1989, McGraw-Hill

REFERENCE BOOKS:

1. Bernard Sklar, "Digital Communications-Fundamental and Application", PE.
2. John G. Proakis, "Digital Communications", 5 th Edition, 2008, TMH.
3. Salvatore Gravano, "Introduction to Error Control Codes", Oxford
4. Todd K.Moon, "Error Correction Coding – Mathematical Methods and Algorithms", 2006, Wiley India.
5. Ranjan Bose, "Information Theory, Coding and Cryptography", 2nd Edition, 2009, TMH.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

III Year B.Tech ECE-I Sem **L / T / P /C**
3 / 0 / 0 / 3

(1804PE03) ELECTRONIC MEASUREMENT & INSTRUMENTATION

(Professional Elective – I)

Course Objectives:

The main objectives are:

1. It provides an understanding of various measuring systems functioning and metrics for performance analysis.
2. Provides understanding of principle of operation, working of different electronic instruments viz. signal generators, signal analyzers, recorders and measuring equipment.
3. Provides understanding of use of various measuring techniques for measurement of different physical parameters using different classes of transducers.
4. To introduce the basic principles of all measuring instruments
5. To deal with the measurement of voltage, current Power factor, power, energy and Magnetic Measurements.

Course Outcomes:

Student will be:

1. Understand the block schematic, performance, and static/dynamic characteristics of measuring instruments and analyze various errors in measurement.
2. Apply the principles of potentiometers, instrument transformers, and electrostatic voltmeters to measure resistance, voltage, and current in various systems.
3. Analyze the operation of wattmeters and energy meters for power and energy measurements in single-phase and three-phase systems, and perform error analysis.
4. Explain the working and applications of signal analyzers and signal generators for analyzing waveforms, frequencies, and other signal characteristics.
5. Analyze the block schematic of CROs, time base circuits, and specialized oscilloscopes to measure parameters like time, frequency, and phase.
6. Design measurement setups using oscilloscopes, analyzers, and advanced instruments for precise parameter evaluation in engineering applications.

UNIT – I: Block Schematics of Measuring Systems:

Performance Characteristics, Static Characteristics, Accuracy, Precision, Resolution, Types of Errors, Gaussian Error, Root Sum Squares formula, Dynamic Characteristics, Repeatability, Reproducibility, Fidelity, Lag ;Measuring Instruments: DC Voltmeters, D' Arsonval Movement, DC Current Meters, AC Voltmeters and Current Meters, Ohmmeters, Multimeters, Meter Protection, Extension of Range, True RMS Responding Voltmeters, Specifications of Instruments.

UNIT– II: Potentiometers & Instrument transformers:

Principle and operation of D.C. Crompton's potentiometer – standardization – Measurement of unknown resistance, current, voltage. A.C. Potentiometers: polar and coordinate type's standardization – applications. CT and PT – Ratio and phase angle errors.Errors and compensations, extension of range using shunts and series resistance. Electrostatic Voltmeters-electrometer type and attracted disc type – extension of range of E.S. Voltmeters.

UNIT –III: Measurement of Power & Energy: Single phase dynamometer wattmeter, LPF and UPF, Double element and three element dynamometer wattmeter, expression for deflecting and control torques – Extension of range of wattmeter using instrument transformers – Measurement of active and reactive powers in balanced and unbalanced systems. Single phase induction type energy meter – driving and braking torques – errors and compensations – testing by phantom loading using R.S.S. meter. Three phase energy meter – tri-vector meter, maximum demand meters.

UNIT – IV: Signal Analyzers:

AF, HF Wave Analyzers, Harmonic Distortion, Heterodyne wave Analyzers, Spectrum Analyzers, Power Analyzers, Capacitance-Voltage Meters, Oscillators. Signal Generators: AF, RF Signal Generators, Sweep Frequency Generators, Pulse and Square wave Generators, Function Generators, Arbitrary Waveform Generator, Video Signal Generators, and Specifications.

UNIT – V: Oscilloscopes:

CRT, Block Schematic of CRO, Time Base Circuits, Lissajous Figures, CRO Probes, High Frequency CRO Considerations, Delay lines, Applications: Measurement of Time, Period and Frequency Specifications. Special Purpose Oscilloscopes: Dual Trace, Dual Beam CROs, Sampling Oscilloscopes, Storage Oscilloscopes, Digital Storage CROs.

TEXT BOOKS:

1. Electronic Measurements and Instrumentation – K. Lal Kishore, Pearson Education 2010.
2. Electronic Instrumentation: H.S.Kalsi – TMH, 2nd Edition 2004.
3. "G. K. Banerjee", "Electrical and Electronic Measurements", PHI Learning Pvt. Ltd., 2nd Edition, 2016
4. "S. C. Bhargava", "Electrical Measuring Instruments and Measurements", BS Publications, 2012.

REFERENCE BOOKS:

1. "A. K. Sawhney", "Electrical & Electronic Measurement & Instruments", Dhanpat Rai & Co. Publications, 2005.
2. "R. K. Rajput", "Electrical & Electronic Measurement & Instrumentation", S. Chand and Company Ltd., 2007.
3. "Buckingham and Price", "Electrical Measurements", Prentice – Hall, 1988.

4. "Reissland, M. U", "Electrical Measurements: Fundamentals, Concepts, Applications", New Age International (P) Limited Publishers, 1st Edition 2010.
5. Electronic Instrumentation and Measurements – David A. Bell, Oxford Univ.Press, 1997.
6. Modern Electronic Instrumentation and Measurement Techniques: A.D. Helbincs, W.D.Cooper: PHI 5th Edition 2003
7. Electronic Measurements and Instrumentation: B.M. Oliver, J.M. Cage TMH Reprint 2009.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(Autonomous Institution- UGC, Govt. of India)

III Year B. Tech ECE-II Sem **L/ T / P / C**
3 / 0 / 0 / 3

(18000HS05) MANAGEMENT SCIENCE

Objectives:

This course is intended to familiarize the students with the framework for the managers and leaders available for understanding and making decisions relating to issues in organizational structure, production operations, marketing, human resource management, product management and strategy.

Outcomes:
By the end of the course, the student will be in a position to

1. To introduce the concepts related Motivation, leadership and organization structures
2. To Understand the concepts of Production mets and operations management
3. To understand the markets, customers and competition better and price the given products appropriately
4. To introduce the concepts and Functions of Human resource Management
5. To work with the Schedule of project management
6. To use Strategy management tools and contemporary issues for decision making

UNIT - I:

Introduction to Management and Organization: Concepts of Management and organization- nature, importance and Functions of Management, Taylor's Scientific Management Theory- Fayol's Principles of Management- Maslow's theory of Hierarchy of Human Needs- Douglas McGregor's Theory X and Theory Y - Hertzberg Two Factor Theory of Motivation - Leadership Styles, Designing Organizational Structures: Basic concepts related to Organisation - Departmentation and Decentralization.

UNIT - II:

Operations and Marketing Management: Principles and Types of Plant Layout-Methods of Production(Job, batch and Mass Production), Work Study - Basic procedure involved in Method Study and Work Measurement - Statistical Quality Control: control charts for Variables and Attributes (simple Problems) and Acceptance Sampling, TQM, Six Sigma, Objectives of Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Store Records - JIT System, Supply Chain Management, Functions of Marketing, Marketing Mix, and Marketing Strategies based on Product Life Cycle, Channels of distribution.

UNIT - III:

Human Resources Management(HRM): Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Performance Appraisal, Job Evaluation and Merit Rating - Performance Management System.

UNIT - IV:

Project Management (PERT/ CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, (simple problems).

UNIT - V:

Strategic Management and Contemporary Strategic Issues: Mission, Goals, Objectives, Policy, Strategy, Programmes, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Bench Marking and Balanced Score Card as Contemporary Business Strategies.

TEXT BOOKS:

1. Stoner, Freeman, Gilbert, Management, 6th Ed, Pearson Education, New Delhi, 2004.
2. P. Vijay Kumar, N. Appa Rao and Ashnab, Chnalill, Cengage Learning India, 2012.

REFERENCE BOOKS:

1. Kotler Philip and Keller Kevin Lane: Marketing Management, Pearson, 2012.
2. Koontz and Weihrich: Essentials of Management, McGraw Hill, 2012.
3. Thomas N. Duening and John M. Ivancevich Management - Principles and Guidelines, Biztantra, 2012.
4. Kanishka Bedi, Production and Operations Management, Oxford Uiversity Press, 2012.
5. Samuel C. Certo: Modern Management, 2012.
6. Schermerhorn, Capling, Poole and Wiesner: Management, Wiley, 2012.
7. Parnell: Strategic Management, Cengage, 2012.
8. Lawrence R Jauch, R. Gupta and William F. Glueck: Business Policy and Strategic Management Science, McGraw Hill, 2012.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(UGC AUTONOMOUS)

III Year B.Tech ECE-II Sem **L/ T / P / C**
3 / 0 / 0 / 3

(1804PC10) DIGITAL SIGNAL PROCESSING

Course Objectives:
This course is an essential course that provides design techniques for processing all type of signals in various fields. The main objectives are:

- To provide background and fundamental material for the analysis and processing of digital signals.
- To familiarize the relationships between continuous-time and discrete time signals and systems.
- To study fundamentals of time, frequency and Z-plane analysis and to discuss the inter-relationships of these analytic method.
- To study the designs and structures of digital (IIR and FIR) filters from analysis to synthesis for a given specifications.
- The impetus is to introduce a few real-world signal processing applications.
- To acquaint in FFT algorithms, Multi-rate signal processing techniques and finite word length effects.

Course Outcomes:

On completion of this subject, the student should be able to:

- Explain the fundamentals of digital signal processing, including discrete-time signals, linear shift-invariant systems, and Z-transform applications.
- Analyze the properties of the Discrete Fourier Transform (DFT) and implement linear convolution using DFT, Overlap-Add, and Overlap-Save mets.
- Apply Fast Fourier Transform (FFT) algorithms, including Radix-2 Decimation-in-Time and Decimation-in-Frequency techniques, for efficient computation of DFT.
- Design and implement IIR digital filters using analog filter approximations, bilinear transformation, and impulse-invariant mets
- Design FIR digital filters using Fourier mets, windowing techniques, and frequency sampling approaches, and compare their performance with IIR filters.
- Evaluate multirate digital signal processing techniques such as sampling rate conversion, down-sampling, and up-sampling, while analyzing finite word-length effects on filter performance.

UNIT – I

Introduction: Introduction to Digital Signal Processing: Discrete Time Signals & Sequences, conversion of continuous to discrete signal, Normalized Frequency, Linear Shift Invariant Systems, Stability, and Causality, linear differential equation to difference equation, Linear Constant Coefficient Difference Equations, Frequency Domain Representation of Discrete Time Signals and Systems.

Realization of Digital Filters: Applications of Z – Transforms, Solution of Difference Equations of Digital Filters, System Function, Stability Criterion, Frequency Response of

Stable Systems, Realization of Digital Filters – Direct, Canonic, Cascade and Parallel Forms.

UNIT - II

Discrete Fourier Transforms: Properties of DFT, Linear Convolution of Sequences using DFT, Computation of DFT: Over-Lap Add Method, Over-Lap Save Method, Relation between DTFT, DFS, DFT and Z-Transform.

Fast Fourier Transforms: Fast Fourier Transforms (FFT) - Radix-2 Decimation-in-Time and Decimation-in-Frequency FFT Algorithms, Inverse FFT, and FFT with General Radix-N

UNIT - III

IIR Digital Filters: Analog filter approximations – Butterworth and Chebyshev, Design of IIR Digital Filters from Analog Filters, Step and Impulse Invariant Techniques, Bilinear Transformation Method, Spectral Transformations.

UNIT – IV

FIR Digital Filters: Characteristics of FIR Digital Filters, Frequency Response, Design of FIR Filters: Fourier Method, Digital Filters using Window Techniques, Frequency Sampling Technique, Comparison of IIR & FIR filters.

UNIT - V

Multirate Digital Signal Processing: Introduction, Down Sampling, Decimation, Upsampling, Interpolation, Sampling Rate Conversion, Conversion of Band Pass Signals, Concept of Resampling, Applications of Multi Rate Signal Processing.

Finite Word Length Effects: Limit cycles, Overflow Oscillations, Round-off Noise in IIR Digital Filters, Computational Output Round off Noise, Methods to Prevent Overflow, Trade off between Round Off and Overflow Noise, Measurement of Coefficient Quantization Effects through Pole-Zero Movement, Dead Band Effects.

TEXT BOOKS:

1. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education / PHI, 2007.
2. Discrete Time Signal Processing – A. V. Oppenheim and R.W. Schaffer, PHI, 2009
3. Fundamentals of Digital Signal Processing – Loney Ludeman, John Wiley, 2009

REFERENCES:

1. Digital Signal Processing – Fundamentals and Applications – Li Tan, Elsevier, 2008
2. Fundamentals of Digital Signal Processing using MATLAB – Robert J. Schilling, Sandra L. Harris, Thomson, 2007
3. Digital Signal Processing - A Practical approach, Emmanuel C. Ifeachor and Barrie W. Jervis, 2nd Edition, Pearson Education, 2009

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution- UGC, Govt. of India)

III Year B.Tech ECE-II Sem **L/ T/ P/ C**
3 / 0/ 0/ 3

(1804PC11) ELECTROMAGNETIC WAVES

Course Objectives:

This is a structured foundation course, dealing with concepts, formulations and applications of Electromagnetic Theory and Transmission Lines, and is the basic primer for all electronic communication engineering subjects. The main objectives of the course are

- To learn the Basic Laws, Concepts and proofs related to Electrostatic Fields and Magnetostatic Fields, and apply them to solve physics and engineering problems.
- To distinguish between static and time-varying fields, and understand the significance and utility of Maxwell's Equations and Boundary Conditions, and gain ability to provide solutions to communication engineering problems.
- To analyze the characteristics of Uniform Plane Waves (UPW), determine their propagation parameters and estimate the same for dielectric and dissipative media.
- To get familiarized with microwave frequency bands, their applications and to understand the limitations and losses of conventional tubes at these frequencies.
- To impart the knowledge of scattering matrix, its formulation and utility and establishing the S-Matrix for various types of multiport junctions.
- To understand the concepts of microwave measurements, identify the equipment required and precautions to be taken, and get familiarized with the methods of measurement of microwave power and various other microwave parameters.

Course Outcomes:

Having gone through this foundation course, the students would be able to

- Distinguish between the static and time-varying fields, establish the corresponding sets of Maxwell's Equations and Boundary Conditions, and use them for solving engineering problems.
- Analyze the Wave Equations for good conductors and good dielectrics, and evaluate the UPW Characteristics for several practical media of interest.
- Demonstrate the concept of Electromagnetic wave and its characteristics in different propagation media to calculate boundary value problems.
- Determine completely the rectangular waveguides, their mode characteristics, and design waveguides for computing practical microwave transmission line problems.
- Derive the properties of Scattering Matrix, formulate the S-Matrix for various microwave junctions, and understand the utility of S-parameters in microwave component design.
- Set up a microwave bench, establish the measurement procedure and conduct the experiments in microwave lab for measurement of various microwave parameters.

UNIT-1

Electrostatics: Review of Coordinate systems, Coulomb's law, Electric field intensity-Fields due to different charge distributions, Electric flux density, Gauss law and its applications, Electric potential, Relations between Electric Field Intensity (E) and Potential (V), Maxwell 's Equations for electrostatic fields, Energy density. Convention and Conduction currents, Dielectric constant, Linear, Isotropic and Homogeneous Dielectrics, Continuity equation, Relaxation time, Poisson's and Laplace's equations, Uniqueness Theorem, Capacitance-Parallel Plate, Coaxial and Spherical Capacitors, Illustrative Problems.

UNIT-2

Magnetostatics : Biot-Savart's Law, Ampere's Circuital Law and its Applications, Magnetic Flux Density, Maxwell's Equations for Magneto static Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law, Inductance and Magnetic Energy. Maxwell's Equations for Time varying fields: Faraday's Law of induced emf, Inconsistency of Ampere's Law, Conditions at a Boundary Surface: Dielectric-Dielectric and Dielectric– Conductor Interfaces, Illustrative Problems.

UNIT-3

EM Wave Characteristics : Wave Equations for Conducting and Dielectric Media, Uniform Plane Wave, Relation Between E and H, Sinusoidal Variations, Wave Propagation in Lossless and Conducting Media, Conductors and Dielectrics – Characterization, Wave Propagation in Good Conductors and Good Dielectrics, Polarization. Reflection and Refraction of Plane Waves – Normal and Oblique Incidences for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance, Poynting Vector and Poynting's Theorem, Illustrative Problems.

UNIT-4

Waveguides: Electromagnetic Spectrum and Microwave Bands. Rectangular Wave guides – Solution of Wave Equations in Rectangular Coordinates, TE/TM mode and TEM analysis, Expressions for Fields, Characteristic Equation and Cut-off Frequencies, Dominant and Degenerate Modes, Sketches of TE, TM and TEM mode fields in the cross-section, Phase and Group Velocities, Wavelengths and Impedance Relations, Equation of Power Transmission, Impossibility of TEM Mode. Micro strip Lines – Z_o Relations, Effective Dielectric Constant, Illustrative Problems.

UNIT-5

Scattering Matrix– Significance, Formulation and Properties, S Matrix Calculations for – 2 port Junctions, E plane and H plane Tees, Magic Tee, Directional Coupler, Circulator, Isolator and Gyrator, Illustrative Problems.

Microwave Measurements: Description of Microwave Bench – Different Blocks and their Features, Errors and Precautions, Mode Characteristics of Reflex Klystron, Volt-Ampere Characteristics of Gunn Diode, Microwave Power Measurement, Bolometers. Measurement of Attenuation, Frequency Measurement. Standing Wave Measurements – Measurement of

Low and High VSWR, Measurement of Quality factor of Cavity Resonator, Impedance Measurements. Illustrative Problems.

TEXT BOOKS:

1. Principles of Electromagnetics – Matthew N.O. sadiku and S.V. Kulkarni, 6th Ed., Oxford University Press, Aisan Edition,2015.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, 2nd Ed. 2000,PHI.
3. Microwave Devices and Circuits – Samuel Y. Liao, Pearson, 3rd Edition,2003.

REFERENCE BOOKS:

1. Engineering Electromagnetics – Nathan Ida, 2nd Ed., 2005, Springer (India) Pvt. Ltd., New Delhi.
2. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, 7th Ed., 2006, MC GRAW HILLEDUCATION
3. Microwave and Radar Engineering – M.Kulkarni, Umesh Publications, 3rd Edition,2003.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

III Year B.Tech ECE-II Sem **L/T/ P/ C**
0 /0/ 3/ 1.5

(1804PC67) DIGITAL SIGNAL PROCESSING LAB

Course Objectives

The objective of the course to practical implementation of the convolution, correlation, DFT, IDFT, Convolution, Signal smoothing, filtering of long duration signals and multirate signal processing.

Course Outcomes

After studying this course the students would be able to

- Implement recursive difference equations to generate sinusoidal waveforms and signals
- Analyze the histogram of white Gaussian noise and uniformly distributed noise, and interpret the statistical properties of the signals
- Calculate the Discrete Fourier Transform (DFT) and Inverse DFT (IDFT) of given discrete-time signals, and interpret their frequency-domain characteristics
- Evaluate the frequency response of a given system using transfer function or differential equation mets, and validate the results with theoretical expectations
- Design and implement Fourier series coefficients using the formula and Fast Fourier Transform (FET) for signal analysis, and compare the results for a half-sine wave.
- Implement and analyze the performance of FIR and IIR filters for given sequences/signals, and design low-pass and high-pass filters for specific applications.

LIST OF EXPERIMENTS

1. Generation of Sinusoidal Waveform / Signal based on Recursive Difference Equations
2. Histogram of White Gaussian Noise and Uniformly Distributed Noise.
3. To find DFT / IDFT of given DT Signal
4. To find Frequency Response of a given System given in Transfer Function/Differential equation form.
5. Obtain Fourier series coefficients by formula and using FET and compare for half sine ave.
6. Implementation of FFT of given Sequence
7. Determination of Power Spectrum of a given Signal(s).
8. Implementation of LP FIR Filter for a given Sequence/Signal.
9. Implementation of HP IIR Filter for a given Sequence/Signal
10. Generation of Narrow Band Signal through Filtering
11. Generation of DTMF Signals

12. Implementation of Decimation Process
13. Implementation of Interpolation Process
14. Implementation of I/D Sampling Rate Converters
15. Impulse Response of First order and Second Order Systems.

BEYOND THE SYLLABUS

1. DCT
2. DIGITAL IMAGE PROCESSING

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

III Year B.Tech ECE-II Sem **L/ T/ P/ C**
0 / 0/ 3/ 1.5

(1804PC68) ELECTROMAGNETIC WAVES LAB

COURSE OBJECTIVES:

- To gain practical hands on experience to gain various microwave sources and devices.
- To introduce the Microwave Test Bench for measuring different parameters like attenuation, VSWR, Frequency etc.
- To understand the usage of microwave components.
- To impart the Knowledge of Scattering Matrix, its formulation and utility, and establish the S-Matrix for various types of microwave junctions.
- To understand radiation pattern of antenna measurement

COURSE OUTCOMES:

- Realize the need for solid state microwave sources to find their characteristics.
- Set up a microwave bench, establish the measurement procedure and conduct the experiments in microwave lab for measurement of various microwave parameters.
- Distinguish between the different types of waveguide and ferrite components, explain their functioning and select proper components for solving engineering problems.
- Determine the S-Matrix for various types of microwave junctions to compute S-Parameters.
- Calculate various waveguide parameters to identify microwave structures.
- Analyze various antenna radiation patterns to recognize the types of antennas.

LIST OF EXPERIMENTS

Note: Minimum of 12 experiments to be conducted

1. Reflex Klystron Characteristics
2. Gunn Diode Characteristics
3. Directional Coupler Characteristics
4. Measurement of Scattering Parameters of a E plane Tee
5. Measurement of Scattering Parameters of a H plane Tee
6. Measurement of Scattering Parameters of a Magic Tee
7. Measurement of Scattering Parameters of a Circulator
8. Attenuation Measurement
9. Microwave Frequency Measurement
10. Measurement of Waveguide Parameters
11. VSWR Measurement of Matched load
12. VSWR measurement with open and short circuit loads
13. Measurement of Impedance of a given Load
14. Antenna Pattern Measurements.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution- UGC, Govt. of India)

III Year B.Tech ECE-II Sem **L/ T/ P /C**
2 / 0/ 0 / 0

(1800MC05) TECHNICAL COMMUNICATION & SOFT SKILLS

INTRODUCTION:

Technical Communication and Soft skills focuses on enhancing students' communication. A thorough drill in grammar exercises is given. Various technical writing styles and skills are developed. The future placement needs of the students are met by giving them an exposure to group discussions and mock interviews. The students hone these skills under the guidance of instructor whose constant evaluation helps in the professional development. This course fulfills the need of the aspirants in acquiring and improving the skills required for placements and professional success.

OBJECTIVES:

- To make the students recognize the role of Technical English in their academic and professional fields.
- To improve language proficiency and develop the required professional skills.
- To equip students with tools to organize, comprehend, draft short and long forms of technical work.

OUTCOMES:

- The students will be able to understand information which assists in completion of the assigned job tasks more successfully.
- Students will be able to communicate their ideas by writing projects, reports, instructions, diagrams and many other forms of professional writing
- Students will also be able to adhere to ethical norms of scientific communication
- Students will be able to strengthen their individual and collaborative work strategies
- Understanding the social issues and applying analytical abilities to solve the issues

UNIT I – Personal Evaluation

Self-Assessment and Self- Awareness - Self-Esteem - Perception and Attitudes - Values and Beliefs - Time Management- Concord

UNIT 2 - Professional Communication

Extempore - Oral Presentations – Presentation Aids- Email Writing, Business Letter Writing - Memo Writing - Transformation of Sentences

UNIT 3 – Career Planning

Group Discussion, Interviews - Leadership Skills & Team Building - Personal Goal Setting and Career Planning - Complex Problem Solving - Creativity - Role and Responsibilities of an Engineer - Tenses

UNIT 4 - Technical Writing

Principles of Effective Writing - Editing Strategies to Achieve Appropriate Technical Style – Technical Report Writing - Voice

UNIT 5 - Ethics and Responsibilities

Personality Development in Social and Office Settings – Netiquettes - Work Culture and Cubicle Etiquettes - Correction of Sentences

TEXT BOOKS:

1. David F. Beer and David Mc Murrey, Guide to writing as an Engineer, John Willey. New York,2004
2. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)
3. Shiv Khera, You Can Win, Macmillan Books, New York,2003.
4. Raman Sharma, Technical Communications, Oxford Publication, London,2004.

REFERENCE BOOKS:

1. Meenakshi Raman, Prakash Singh, Business communication, Oxford Publication, New Delhi2012.
2. Dale Jung k, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4)
3. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi2002.
4. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN0402213)

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

III Year B.Tech ECE-II Sem **L / T / P /C**
3 / 0 / 0 / 3

(1804PE04) MOBILE COMMUNICATIONS

(Professional Elective – II)

Course Objectives

- To provide the student with an understanding of the Cellular concept, Frequency reuse, Hand-off strategies.
- To enable the student to analyze and understand wireless and mobile cellular communication systems over a stochastic fading channel
- To provide the student with an understanding of Co-channel and Non- Co-channel interference
- To give the student an understanding of cell coverage for signal and traffic, diversity techniques and mobile antennas.
- To give the student an understanding of frequency management, Channel assignment and types of handoff.

Course Outcomes

By the end of the course, the student will be able to analyze and design wireless and mobile cellular systems.

- To know the evolution of Mobile communication and cell concept to improve capacity of the system.
- Design and analyze various cellular systems considering interferences.
- Analyze radio channel characteristics in different propagation environments
- Examine different frequency management and channel assignment techniques
- Demonstrate knowledge on different types of hand-off and mechanisms.
- Examine different Multiple access techniques.

UNIT -I

Introduction to Cellular Mobile Radio Systems: Limitations of Conventional Mobile Telephone Systems, Basic Cellular Mobile System, First, Second, Third and Fourth Generation Cellular Wireless Systems, Uniqueness of Mobile Radio Environment- Fading -Time Dispersion Parameters, Coherence Bandwidth, Doppler Spread and Coherence Time. **Fundamentals of Cellular Radio System Design:** Concept of Frequency Reuse, Co-Channel Interference, Co-Channel Interference Reduction Factor, Desired C/I From a Normal Case in a Omni Directional Antenna System, System Capacity, Trunking and Grade of Service, Improving Coverage and Capacity in Cellular Systems- Cell Splitting, Sectoring, Microcell Zone Concept.

UNIT –II

Co-Channel Interference: Measurement Of Real Time Co-Channel Interference, Design of Antenna System, Antenna Parameters and Their Effects, Diversity Techniques-Space Diversity, Polarization Diversity, Frequency Diversity, Time Diversity.

Non-Co-Channel Interference: Adjacent Channel Interference, Near End Far End Interference, Cross Talk, Effects on Coverage and Interference by Power Decrease, Antenna Height Decrease, Effects of Cell Site Components.

UNIT –III

Cell Coverage for Signal and Traffic: Signal Reflections in Flat And Hilly Terrain, Effect of Human Made Structures, Phase Difference Between Direct and Reflected Paths, Constant Standard Deviation, Straight Line Path Loss Slope, General Formula for Mobile Propagation and Flat Open Area, Near and Long Distance Propagation, Path Loss From a Point to Point Prediction Model in Different Conditions, Merits of Lee Model. Cell Site and Mobile Antennas: Space Diversity Antennas, Umbrella Pattern Antennas, Minimum Separation of Cell Site Antennas, Mobile Antennas.

UNIT - IV

Frequency Management and Channel Assignment: Numbering and Grouping, Setup Access and Paging Channels, Channel Assignments to Cell Sites and Mobile Units, Channel Sharing and Borrowing, Sectorization, Overlaid Cells, Non Fixed Channel Assignment. **Coding:** Vocoders, Linear Predictive coders, Selection of Speech Coders for Mobile Communication.

UNIT - V

Handoffs and Dropped Calls: Handoff Initiation, Types of Handoff, Delaying Handoff, Advantages of Handoff, Power Difference Handoff, Forced Handoff, Mobile Assisted and Soft Handoff, Intersystem Handoff, Introduction to Dropped Call Rates and their Evaluation. Multiple Access Techniques: FDMA, TDMA, CDMA, SDMA, Capacity of Cellular CDMA and SDMA.

TEXT BOOKS

1. Mobile Cellular Telecommunications — W.C.Y. Lee, McGraw Hill, 2nd Edn., 1989.
2. Wireless Communications – Theodore. S. Rapport, Pearson Education, 2nd Edn., 2002.
3. W.C.Y.Lee, "Mobile Communications Engineering: Theory and applications, Second Edition, McGraw-Hill International, 1998.

REFERENCE BOOKS

1. Principles of Mobile Communications — Gordon L. Stuber, Springer International, 2nd Edn., 2001.
2. Modern Wireless Communications-Simon Haykin, Michael Moher, Pearson Education, 2005.
3. Wireless Communications Theory and Techniques, Asrar U. H .Sheikh, Springer, 2004.
4. Wireless Communications and Networking, Vijay Garg, Elsevier Publications, 2007.
5. Wireless Communications —Andrea Goldsmith, Cambridge University Press, 2005.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

III Year B.Tech ECE-II Sem **L / T / P /C**
3 / 0 / 0 / 3

(1804PE05) WAVELET TRANSFORMS

(Professional Elective – II)

Course Objectives

- To provide the student with an understanding the Fourier analysis, Properties and Applications.
- To enable the student to analyze and understand different Transform and its Properties.
- To provide the student with an understanding of Continuous wavelet Transform.
- To give the student an understanding of multi rate Analysis and DWT.
- To give the student an understanding of Wavelet packet Transform and Multi Wavelets.

Course Outcomes

By the end of the course, the student will be able to analyze and design wavelet Transforms.

- Explain the fundamental concepts of Fourier Analysis, including vector spaces, Hilbert spaces, Fourier basis, and time-frequency analysis.
- Apply transforms such as Walsh, Hadamard, Haar, Slant Transforms, DCT, DST, and KLT, and analyze their properties and applications in signal processing.
- Understand and explain the concept of Continuous Wavelet Transform (CWT), its advantages over STFT, and its applications using various wavelets like Haar, Mexican Hat, Meyer, Daubechies.
- Analyze multi-rate analysis and Discrete Wavelet Transform (DWT), including its multi-resolution analysis, filter banks, and applications in signal processing...
- Apply advanced techniques such as wavelet packet transform, multidimensional wavelets, bi-orthogonal basis, and B splines in real-world signal processing problems.
- Design and implement experiments using wavelet transforms in practical applications, setting up measurement procedures and analyzing results.

UNIT -I : Fourier Analysis: Vector space, Hilbert spaces, Fourier basis, FT- Limitations of Fourier Analysis, Need for time-frequency analysis, DFT, 2D-DFT: Definition, Properties and Applications, IDFT, Hilbert Transform, STFT.

UNIT -II: Transforms: Walsh, Hadamard, Haar and Slant Transforms, DCT, DST, KLT– definition, properties and applications.

UNIT -III: Continuous Wavelet Transform (CWT): Short comings of STFT, Need for wavelets, Wavelet Basis Concept of Scale and its relation with frequency, Continuous time wavelet Transform Equation- Series Expansion using Wavelets- CWT- Tiling of time scale plane for CWT, Inverse CWT. Important Wavelets: Haar, Mexican Hat, Meyer, Shannon, Daubechies.

UNIT -IV: Multi Rate Analysis and DWT: Need for Scaling function – Multi Resolution

Analysis, Two-Channel Filter Banks, Perfect Reconstruction Condition, Relationship between Filter Banks and Wavelet Basis, DWT, Structure of DWT Filter Banks, Daubechies Wavelet Function, Applications of DWT.

UNIT -V: Special Topics: Wavelet Packet Transform, Multidimensional Wavelets, Bi-orthogonal basis- B Splines, Filtering relationship for bi-orthogonal filters, Lifting Scheme of Wavelet Generation, Multi Wavelets.

TEXT BOOKS:

- RaghuveerM.Rao and Ajit S. Bopardikar, "Wavelet Transforms-Introduction theory and applications" Pearson Edu, Asia, New Delhi, 2003.
- Soman. K. P, Ramachandran. K.I, "Insight into Wavelets from Theory to Practice" Printice Hall India, 1st Edition, 2004.

REFERENCE BOOKS:

- Jaideva C Goswami, Andrew K Chan, "Fundamentals of Wavelets- Theory, Algorithms and Applications" John Wiley & Sons, Inc, Singapore, 1999.
- Vetterli M. Kovacevic, "Wavelets and Sub-band Coding", PJI, 1995.
- C. Sydney Burrus, "Introduction to Wavelets and Wavelet Transforms", PHI, 1st Edition, 1997.
- Stephen G. Mallat,v, "A Wavelet Tour of Signal Processing" , Academic Press, 2nd Edition
- S.Jayaraman, S.Esakkirajan, T.Veera Kumar, "Digital Image Processing" , TMH, 2009

.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

III Year B.Tech ECE-II Sem **L / T / P /C**
3 / 0 / 0 / 3

(1804PE06) AUTOMOTIVE ELECTRONICS

(Professional Elective – II)

Course Objectives

- To provide the student with an understanding the working and design of charging circuits.
- To enable the student to analyze and understand the Ignition and Injection Systems.
- To provide the student with an understanding of Sensor and Actuators.
- To give the student an understanding of control models for fuel control and CAN standard.
- To give the student an understanding of chassis and Safety Systems.

Course Outcomes

By the end of the course, the students will be able to use advanced sensors and actuators in the up gradation of automobiles.

- Understand the evolution of electronics in automobiles, including emission laws, automobile physical configurations, and international standards such as Euro and Bharat Standards.
- Analyze the working and design of automobile charging systems, alternators, and starter systems, including circuits for starter motors and requirements of the starting system.
- Understand the fundamentals of ignition systems and including electronic ignition systems, programmed ignition, fuel injection systems for both petrol and diesel engines.
- Explain the working principles and characteristics of various sensors and actuators used in automobiles, including airflow rate sensors, crankshaft position sensors, temperature sensors, and fuel injectors.
- Understand and analyze the engine control systems, including fuel control, ignition control, different ECUs, and vehicle networks such as CAN and diagnostics systems.
- Analyze various chassis and safety systems in modern automobiles, including traction control systems, cruise control systems, ABS, electronic suspension systems, and airbag systems.

UNIT I : INTRODUCTION

Evolution of electronics in automobiles – emission laws –Automobile Physical Configuration-introduction to Euro I, Euro II, Euro III, Euro IV, Euro V standards – Equivalent Bharat Standards. Charging systems: Working and design of charging circuit diagram – Alternators – Requirements of starting system - Starter motors and starter circuits.

UNIT II : IGNITION AND INJECTION SYSTEMS

Ignition systems: Ignition fundamentals - Electronic ignition systems - Programmed Ignition – Distribution less ignition - Direct ignition – Spark Plugs. Electronic fuel Control: Basics of combustion – Engine fuelling and exhaust emissions – Electronic control of carburetion – Petrol fuel injection – Diesel fuel injection.

UNIT III: SENSOR AND ACTUATORS

Working principle and characteristics of Airflow rate, Engine crankshaft angular position, Hall effect, Throttle angle, temperature, exhaust gas oxygen sensors –Strain Gauge MAP sensor-Hall effect Position sensor- study of fuel injector, exhaust gas recirculation actuators, stepper motor actuator, vacuum operated actuator.

UNIT IV: ENGINE CONTROL SYSTEMS

Control modes for fuel control-engine control subsystems – ignition control methodologies – different ECU's used in the engine management – block diagram of the engine management system. In vehicle networks: CAN standard, format of CAN standard – diagnostics systems in modern automobiles.

UNIT V: CHASSIS AND SAFETY SYSTEMS

Traction control system – Cruise control system – electronic control of automatic transmission – antilock braking system – electronic suspension system – working of airbag and role of MEMS in airbag systems – centralized door locking system – climate control of cars.

TEXT BOOKS:

1. Ribbens, "Understanding Automotive Electronics", 7th Edition, Elsevier, Indian Reprint, 2013 REFERENCES:
2. Tom Denton, "Automobile Electrical and Electronics Systems", Edward Arnold Publishers, 2000.
3. Barry Hollembeak, "Automotive Electricity, Electronics & Computer Controls", Delmar Publishers, 2001.
4. Richard K. Dupuy "Fuel System and Emission controls", Check Chart Publication, 2000.
5. Ronald. K. Jurgon, "Automotive Electronics Handbook", McGraw-Hill, 1999.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

III Year B.Tech ECE-II Sem **L / T / P /C**
3 / 0 / 0 / 3

(1804PE07) FIBER OPTIC COMMUNICATION

(Professional Elective – III)

OBJECTIVES

The student will be introduced to the functionality of each of the components that comprise a fiber-optic communication system

- The properties of optical fiber that affect the performance of a communication link and types of fiber materials with their properties and the losses occur in fibers.
- The principles of single and multi-mode optical fibers and their characteristics, working of semiconductor lasers, and differentiate between direct modulation and external electro-optic modulation
- Analyze the operation of LEDs, laser diodes, and PIN photo detectors (spectral properties, bandwidth, and circuits) and apply in optical systems.
- Analyze and design optical communication and fiber optic sensor systems, the models of analog and digital receivers.

OUTCOMES

After going through this course the student will be able to

- Understand the fundamentals of optical fiber communication, including its history, system components, and advantages.
- Analyze optical fiber waveguides, including modes, V-number, and different types of fibers (Step Index, Graded Index, Single Mode).
- Study the materials used in optical fibers, signal distortions like attenuation and dispersion, and fiber splicing techniques.
- Understand the operation of optical sources (LEDs, Injection Laser Diodes) and detectors (PIN, APD), and their performance parameters.
- Analyze the source-to-fiber power launching, optical receiver operation, and factors affecting the performance of digital and analog optical receivers.
- Design optical systems, including point-to-point links, link power budgets, rise time budgets, and Wavelength Division Multiplexing (WDM) principles.

UNIT I

Overview of optical fiber communication - Historical development, The general system, advantages of optical fiber communications. **Optical fiber wave guides**- Introduction, Ray theory transmission, Total Internal Reflection, Acceptance angle, Numerical Aperture, Skew rays, Cylindrical fibers- Modes, V-number, Mode coupling, Step Index fibers, Graded Index fibers, Single mode fibers- Cut off wavelength, Mode Field Diameter, Effective Refractive Index, Related problems.

UNIT II

Fiber materials:- Glass, Halide, Active glass, Chalgenide glass, Plastic optical fibers. Signal distortion in optical fibers-Attenuation, Absorption, Scattering and Bending losses, Core and Cladding losses, Information capacity determination, Group delay, Types of Dispersion:- Material dispersion, Wave-guide dispersion, Polarization-Mode dispersion, Intermodal dispersion, Pulse broadening in Graded index fiber, Related problems.

Optical fiber Connectors-Connector types, Single mode fiber connectors, Connector return loss, Fiber Splicing-Splicing techniques, Splicing single mode fibers, Fiber alignment and joint loss- Multimode fiber joints, single mode fiber joints.

UNIT III

Optical sources- LEDs, Structures, Materials, Quantum efficiency, Power, Modulation, Power bandwidth product.Injection Laser Diodes- Modes, Threshold conditions, External quantum efficiency, Laser diode rate equations,Resonant frequencies, Reliability of LED&ILD, Optical detectors- Physical principles of PIN and APD, Detector response time, Temperature effect on Avalanche gain, Comparison of Photo detectors, Related problems.

UNIT IV

Source to fiber power launching - Output patterns, Power coupling, Power launching, Equilibrium Numerical Aperture, Laser diode to fiber coupling, Optical receiver operation-Fundamental receiver operation, Digital signal transmission, error sources, Receiver configuration, Digital receiver performance, Probability of Error, Quantum limit, Analog receivers.

UNIT V

Optical system design - Point-to- point links- Component choice and considerations, Link power budget, Rise time budget with examples, Line coding in Optical links, WDM, Necessity, Principles, Measurement of Attenuation and Dispersion, Eye pattern.

TEXT BOOKS :

1. Optical Fiber Communications – Gerd Keiser, Mc Graw-Hill International edition, 3rd Edition, 2000.
2. Optical Fiber Communications – John M. Senior, PHI, 2nd Edition, 2002.

RERFERENCES :

1. Fiber Optic Communications – D.K. Mynbaev , S.C. Gupta and Lowell L. Scheiner, Pearson Education,2005.
2. Text Book on Optical Fiber Communication and its Applications – S.C.Gupta, PHI, 2005.
3. Fiber Optic Communication Systems – Govind P. Agarwal , John Wiley, 3rd Ediition, 2004.
4. Fiber Optic Communications – Joseph C. Palais, 4th Edition, Pearson Education, 2004.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

III Year B.Tech ECE-II Sem **L / T / P /C**
3 / 0 / 0 / 3

(1804PE08) DIGITAL IMAGE PROCESSING
(Professional Elective – III)

Course Objectives:

- Understand the fundamentals of digital images, including the processes of sampling and quantization, and the relationship between pixels..
- Apply image transforms such as 2-D FFT, Walsh Transform, Hadamard Transform, DCT, Haar Transform, Slant Transform, and Hotelling Transform in digital image processing
- Implement image enhancement techniques in both the spatial and frequency domains, including point processing, histogram manipulation, and filtering.
- Apply image restoration methods, including inverse filtering, least mean square filters, and constrained least squares restoration.
- Analyze and implement image segmentation techniques such as edge detection, thresholding, and region-oriented segmentation, as well as morphological operations like dilation, erosion, and hit or miss transformation
- Understand and apply image compression methods, including lossless and lossy techniques, Huffman coding, and JPEG 2000 standards..

UNIT - I

Digital Image Fundamentals & Image Transforms:

Digital Image Fundamentals, Sampling and Quantization, Relationship between Pixels. Image Transforms: 2-D FFT, Properties, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar Transform, Slant Transform, Hotelling Transform.

UNIT – II

Image Enhancement (Spatial Domain):

Introduction, Image Enhancement in Spatial Domain, Enhancement through Point Processing, Types of Point Processing, Histogram Manipulation, Linear and Non – Linear Gray Level Transformation, Local or Neighborhood criterion, Median Filter, Spatial Domain High-Pass Filtering.

Image Enhancement (Frequency Domain):

Filtering in Frequency Domain, Low Pass (Smoothing) and High Pass (Sharpening) Filters in Frequency Domain.

UNIT – III

Image Restoration:

Degradation Model, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT – IV

Image Segmentation:

Detection of Discontinuities, Edge Linking And Boundary Detection, thresholding, Region Oriented Segmentation.

Morphological Image Processing:
Dilation and Erosion: Dilation, Structuring Element Decomposition, Erosion, Combining Dilation and Erosion, Opening and Closing, Hit or Miss Transformation.

UNIT – V

Image Compression:
Redundancies and their Removal Methods, Fidelity Criteria, Image Compression Models, Huffman and Arithmetic Coding, Error Free Compression, Lossy Compression, Lossy and Lossless Predictive Coding, Transform Based Compression, JPEG 2000 Standards.

TEXT BOOKS:

1. Digital Image Processing - Rafael C. Gonzalez, Richard E. Woods, 3rd Edition, Pearson, 2008
2. Digital Image Processing- S Jayaraman,

REFERENCES:

1. Kenneth R. Castleman,Digital Image Processing Pearson, 2006.
2. Rafael C. Gonzalez, Richard E. Woods, Steven Eddins,Digital Image Processing using MATLAB Pearson Education, Inc., 2011.
3. D,E. Dudgeon and RM. Mersereau,Multidimensional Digital Signal Processing Prentice Hall Professional Technical Reference, 1990.
4. William K. Pratt,Digital Image Processing John Wiley, New York, 2002
5. Milan Sonka et al Image processing, analysis and machine vision Brookes/Cole, Vikas Publishing House, 2nd edition, 1999

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

III Year B.Tech ECE-II Sem **L / T / P /C**
3 / 0 / 0 / 3

(1804PE09) ROBOTICS ENGINEERING

(Professional Elective – III)

OBJECTIVES:

- To introduce the functional elements of Robotics
- To impart knowledge on the direct and inverse kinematics
- To introduce the manipulator differential motion and control
- To educate on various path planning techniques
- To introduce the dynamics and control of manipulators

OUTCOMES:

- Understand the basic concepts, classifications, specifications, and design considerations of robots
- Solve direct and inverse kinematics problems for robotic manipulators using Denavit-Hartenberg parameters
- Analyze the differential motion, statics, and singularities of robotic manipulators
- Plan robot paths using joint space and Cartesian space techniques with polynomial interpolation methods
- Derive dynamic models of manipulators using Lagrangian mechanics and analyze control schemes.
- Implement PID and force control schemes for robotic manipulators

UNIT I: Basic Concepts

Brief history-Types of Robot–Technology-Robot classifications and specifications-Design and controlissues- Various manipulators – Sensors - work cell - Programming languages.

UNIT II: Direct and Inverse Kinematics

Mathematical representation of Robots - Position and orientation – Homogeneous transformationVarious joints- Representation using the Denavit Hattenberg parameters -Degrees of freedom-Direct kinematics-Inverse kinematics- SCARA robots- Solvability – Solution methods-Closed form solution.

UNIT III : Manipulator Differential Motion and Statics

Linear and angular velocities-Manipulator Jacobian-Prismatic and rotary joints–Inverse -Wrist and arm singularity - Static analysis - Force and moment Balance.

UNIT IV: Path Planning

Definition-Joint space technique-Use of p-degree polynomial-Cubic polynomial-Cartesian space technique - Parametric descriptions - Straight line and circular paths - Position and orientation planning.

UNIT V: Dynamics and Control

Lagrangian mechanics-2DOF Manipulator-Lagrange Euler formulation-Dynamic model – Manipulator control problem-Linear control schemes-PID control scheme-Force control of robotic manipulator.

TEXT BOOKS:

1. R.K.Mittal and I.J.Nagrath, Robotics and Control, Tata McGraw Hill, New Delhi,4th Reprint, 2005.
2. JohnJ.Craig ,Introduction to Robotics Mechanics and Control, Third edition, Pearson Education,3. 2009.
3. M.P.Groover, M.Weiss, R.N. Nageland N. G.Odrej, Industrial Robotics, McGraw-Hill Singapore, 1996.

REFERENCES:

1. Ashitava Ghoshal, Robotics-Fundamental Concepts and Analysis', Oxford University Press, Sixth impression, 2010.
2. K. K.Appu Kuttan, Robotics, I K International, 2007.
3. Edwin Wise, Applied Robotics, Cengage Learning, 2003.
4. R.D.Klafter,T.A.Chimielewski and M.Negin, Robotic Engineering–An Integrated Approach, Prentice Hall of India, New Delhi, 1994.
5. B.K.Ghosh, Control in Robotics and Automation: Sensor Based Integration, Allied Publishers,Chennai, 1998.
6. S.Ghoshal, " Embedded Systems & Robotics" – Projects using the 8051 Microcontroller", Cengage Learning, 2009.

ECE

SYLLABUS

B.Tech - IV YEAR

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

B.Tech. IV Year I Sem. **L / T/ P/ C**
3/ 0 / 0/ 3

(1804PC12) COMPUTER NETWORKS

Course Objectives:
To introduce the fundamental various types of computer networks.

- To demonstrate the TCP/IP and OSI models with merits and demerits. To explore the various layers of OSI Model.
- To introduce UDP and TCP Models.
- To have the concept of different routing techniques for data communications.

Course Outcomes:

- Understand the OSI and TCP/IP models, including their layers, protocols, and addressing schemes
- Describe data link layer concepts such as error control, flow control, framing techniques, and IEEE standards, with examples of protocols and technologies like Ethernet and wireless LANs.
- Apply routing and forwarding protocols, including RIP, OSPF, and BGP, for effective data transmission at the network layer
- Analyze transport layer protocols, specifically TCP, UDP, and SCTP, and assess their roles in ensuring reliable data delivery and congestion control
- Examine various application layer protocols, such as DNS, FTP, and HTTP, and demonstrate their usage in network communication
- Discuss network security mechanisms, including IPSec, SSL, VPNs, and firewall configurations, and describe emerging networking technologies like IPv6, Bluetooth, and Zigbee.

UNIT - I
Introduction to Networks: Internet, Protocols and Standards, the OSI Model, Layers in OSI Model, TCP/IP Suite, Addressing.
Physical Layer: Multiplexing, Transmission Media, Circuit Switched Networks, Datagram Networks, and Virtual Circuit Networks.

UNIT - II
Data Link Layer: Introduction, Checksum, Framing, Flow and Error Control, Noiseless Channels, Noisy Channels, Random Access Controlled Access, Channelization, IEEE Standards, Ethernet, Giga-Bit Ethernet, Wireless LANs, SONET-SDH, Frame Relay and ATM.

UNIT - III
Network Layer: Logical Addressing, Internetworking, Tunneling, Address Mapping, ICMP, IGMP, Forwarding, Routing-Flooding, Bellman& Ford, Disjkstra's routing protocols, RIP, OSPF, BGP,- and Multicast Routing Protocols. Connecting Devices-Passive Hubs, Repeaters, Active Hubs, Bridges, Routers.

UNIT - IV

Transport Layer: Process to Process Delivery, UDP, TCP and SCTP Protocols, Congestion, Congestion Control, Quality of Service.

Application Layer: Domain Name Space, DNS in Internet, Electronic Mail, File Transfer Protocol, WWW, HTTP, SNMP, Multi-Media.

UNIT - V

Network Security: Security services, mechanisms and attacks, IPSec, SSL, VPN, Firewall. Bluetooth, Zigbee, IPv4, IPv6.

TEXT BOOKS:

1. Data Communications and Networking – Behrouz A. Forouzan, 4th Edition Mc Graw Hill Education, 2006.
2. Computer Networks -- Andrew S Tanenbaum, 4th Edition, Pearson Education.
3. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, Pearson Education.

REFERENCES:

1. Data communications and Networks by William Stallings, Pearson Edu. 10th Edition.
2. Data communication and Networks - Bhusan Trivedi, Oxford University Press 2016.
3. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.
4. Understanding Communications and Networks, 3rd Edition, W.A.Shay, Cengage Learning.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

IV Year B.Tech ECE-I Sem **L / T / P /C**
3 / 1/ 0 /4

(1804PC13) MICROPROCESSORS & MICROCONTROLLERS

Course Objectives:

- To develop an understanding of the operations of microprocessors and micro controllers; machine language programming and interfacing techniques.

Course Outcomes:

- Understand the internal architecture, register organization, addressing modes and instruction set of 8086.
- Understand the internal architecture, register organization, addressing modes and instruction set of 8086.
- Implement LCD, RAM, ROM, ADC and DAC interfaces with the 8051 microcontroller and also assess the impact of different external communication interfaces, like RS232 and USB, on system performance and usability in embedded system applications.
- Understand the internal architecture, register organization, addressing modes and instruction set of ARM Processor.
- Understand the internal architecture and applications of CORTEX and OMAP Processors.
- Able to do the real time projects based on advanced processors in embedded systems.

UNIT - I

8086 Architecture: 8086 Architecture-Functional diagram, Register Organization, Memory Segmentation, Programming Model, Memory addresses, Physical Memory Organization, Architecture of 8086, Signal descriptions of 8086, interrupts of 8086.

Instruction Set and Assembly Language Programming of 8086: Instruction formats, Addressing modes, Instruction Set, Assembler Directives, Macros, and Simple Programs involving Logical, Branch and Call Instructions, Sorting, String Manipulations.

UNIT - II

Introduction to Microcontrollers: Overview of 8051 Microcontroller, Architecture, I/O Ports, Memory Organization, Addressing Modes and Instruction set of 8051.

8051 Real Time Control: Programming Timer Interrupts, Programming External Hardware Interrupts, Programming the Serial Communication Interrupts, Programming 8051 Timers and Counters

UNIT – III

I/O And Memory Interface: LCD, Keyboard, External Memory RAM, ROM Interface, ADC, DAC Interface to 8051.

Serial Communication and Bus Interface: Serial Communication Standards, Serial Data Transfer Scheme, On board Communication Interfaces-I2C Bus, SPI Bus, UART; External Communication Interfaces-RS232,USB.

UNIT – IV

ARM Architecture: ARM Processor fundamentals, ARM Architecture – Register, CPSR, Pipeline, exceptions and interrupts interrupt vector table, ARM instruction set – Data processing, Branch instructions, load store instructions, Software interrupt instructions, Program status register instructions, loading constants, Conditional execution, Introduction to Thumb instructions.

UNIT – V

Advanced ARM Processors: Introduction to CORTEX Processor and its architecture, OMAP Processor and its Architecture.

TEXT BOOKS:

1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandani, MHE, 2nd Edition 2006.
2. The 8051 Microcontroller, Kenneth. J. Ayala, Cengage Learning, 3rd Ed.
3. ARM System Developers guide, Andrew N SLOSS, Dominic SYMES, Chris WRIGHT, Elsevier, 2012

REFERENCE BOOKS:

1. Microprocessors and Interfacing, D. V. Hall, MGH, 2nd Edition 2006.
2. Introduction to Embedded Systems, Shibu K.V, MHE, 2009
3. The 8051Microcontrollers, Architecture and Programming and Applications - K.Uma Rao, Andhe Pallavi, Pearson, 2009.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution- UGC, Govt. of India)

IV Year B.Tech ECE-I Sem **L /T / P/ C**
0 / 0 / 3/ 1.5

(1804PC69) COMPUTER NETWORKS LAB

Course Objectives:

1. To Understand the functionalities of various layers of OSI model
2. To understand the operating System functionalities

Course Outcomes:

1. Implement data link layer framing techniques such as character stuffing, bit stuffing, and character stuffing to ensure data integrity
2. Apply CRC polynomial algorithms (CRC-12, CRC-16, and CRC-CCIP) for error detection in data transmission and demonstrate their effectiveness
3. Implement Dijkstra's algorithm to compute the shortest path in a graph, and analyze its efficiency for routing in computer networks
4. Design and implement a distance vector routing algorithm and calculate routing tables based on delay weights in a subnet graph
5. Design and implement encryption and decryption algorithms such as DES and RSA to secure communication over networks.
6. Develop client-server applications using TCP and UDP protocols for file transfer and sentence reversal tasks

System/ Software Requirement

1. Intel based desktop PCs LAN CONNECTED with minimum of 166 MHZ or faster processor with at least 64 MB RAM and 100 MB free disk space

LIST OF EXPERIMENTS

1. Implement the data link layer framing methods such as character, character stuffing, and bit stuffing.
2. Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC CCIP .
3. Implement Dijkstra‘s algorithm to compute the Shortest path thru a graph.
4. Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table art each node using distance vector routing algorithm
5. Take an example subnet of hosts. Obtain broadcast tree for it.
6. Take a 64 bit playing text and encrypt the same using DES algorithm.
7. Write a program to break the above DES coding

8. Using RSA algorithm encrypts a text data and Decrypt the same.
9. C Program to implement Link state routing.
10. Design TCP iterative Client and Server application to reverse the given input sentence.
11. TCP Client and Server application to transfer file.
12. UDP Client and Server application to transfer a file.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution- UGC, Govt. of India)

IV Year B.Tech ECE-I Sem **L / T / P/ C**
0 / 0 / 3 / 1.5

(1804PC70) MICROPROCESSORS & MICROCONTROLLERS LAB

COURSE OBJECTIVES:

The Primary objective of this course is:

- To enable the students to identify the programming model of microprocessor/microcontroller
- To enable the students to use the instruction set architecture to perform various operations.
- To enable the students to write the programs in assembly language to perform a particular task.
- To enable the students to use basic interfacing techniques to connect the microprocessor to outside world.

COURSE OUTCOMES:

- Able to demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessor.
- Able to program using the capabilities of the stack, the program counter, and the status register and show how these are used to execute a machine code program.
- Able to apply knowledge of the microprocessor's internal registers and operations by use of a PC based microprocessor simulator.
- Able to write assembly language programs and download the machine code that will provide solutions real-world control problems using 8255 and 8251.
- Able to verify Timer/Counter, interrupt handling and UART operation in 8051 microcontroller.
- Implement the programs to interface LCD, Keyboard and multiprocessors using 8051 microcontroller.

LIST OF EXPERIMENTS:

1. Programs for 16 bit arithmetic operations 8086(using various addressing modes)
2. Programs for sorting an array for 8086.
3. Programs for searching for a number of characters in a string for 8086.
4. Programs for string manipulation for 8086.
5. Programs for digital clock design using 8086.
6. Interfacing ADC and DAC to 8086.
7. Parallel communication between two microprocessor kits using 8255.
8. Serial communication between two microprocessor kits using 8251.
9. Interfacing to 8086 and programming to control stepper motor.
10. Programming using arithmetic, logical and bit manipulation instructions of 8051.
11. Program and verify Timer/Counter in 8051.
12. Program and verify interrupt handling in 8051.
13. UART operation in 8051.
14. Communication between 8051 kit and PC
15. Interfacing LCD to 8051
16. Interfacing Matrix/Keyboard to 8051

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution- UGC, Govt. of India)

IV Year B.Tech ECE-I Sem **L /T / P/ C**
2 / 0 / 0 / 0

(1800MC06) INDIAN TRADITIONAL KNOWLEDGE
(Mandatory Course)

Course Objectives: To facilitate the students with the concepts of Indian traditional knowledge and to make them understand the Importance of roots of knowledge system.

Course Outcomes:
After completion of the course, students will be able to:

- Upon completion of the course, the students will understand values,ethics
- Understand the concept of Traditional knowledge and its importance
- Know the need and importance of protecting traditional knowledge.
- Know the various enactments related to the protection of traditional knowledge. oscillators employing BJT, FET
- Understand the concepts of Intellectual property
- Understand the need to protect the traditional knowledge.

UNIT I:
Introduction to traditional knowledge: Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge

UNIT II:
Protection of traditional knowledge: the need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

UNIT III: Legal frame work and TK:
A: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmer's Rights Act, 2001 (PPVFR Act);
B: The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indicators act 2003.

UNIT IV:
Traditional knowledge and intellectual property: Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

UNIT V:
Traditional knowledge in different sectors: Traditional knowledge and engineering, traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies

depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK 139

TEXT BOOKS:

1. Traditional Knowledge System in India, by Amit Jha, 2009.
2. Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012.

REFERENCE BOOKS:

1. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002
2. "Knowledge Traditions and Practices of India" Kapil Kapoor1, Michel Danino2

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

IV Year B.Tech ECE-I Sem **L / T / P /C**
3 / 0 / 0 / 3

(1804PE10) SATELLITE COMMUNICATIONS

(Professional Elective – IV)

COURSE OBJECTIVES

- To prepare the student to excel in basic knowledge of satellite communication principles.
- To provide students with solid foundation in orbital mechanics and launches for the satellite communication
- To train the students with the basic knowledge of link design of satellite with a design examples.
- To provide the better understanding of multiple access systems and earth station technology.
- To prepare the students with knowledge in satellite navigation and GPS and satellite packet communication

COURSE OUTCOMES

- To prepare the student to excel in basic knowledge of satellite communication principles.
- To provide students with solid foundation in orbital mechanics and launches for the satellite communication
- To train the students with the basic knowledge of link design of satellite with a design examples
- To provide the better understanding of multiple access systems and earth station technology.
- To equip students with a comprehensive understanding of Earth station technology, satellite navigation systems, and GPS principles for efficient communication and positioning applications.
- To prepare the students with knowledge in satellite navigation and GPS and satellite packet communication

UNIT -I:

Communication Satellite: Orbit and Description: A Brief history of satellite Communication, satellite Frequency Bands, Satellite Systems, Applications, Orbital Period and Velocity, effects of orbital Inclination, Azimuth and Elevation, Coverage angle and slant Range, Eclipse, Orbital Perturbations, Placement of a Satellite in a Geo-Stationary orbit.

UNIT -II:

Satellite Sub-Systems: Attitude and Orbit Control system, TT&C subsystem, Attitude Control subsystem, Power systems, Communication subsystems, Satellite Antenna Equipment. Satellite Link: Basic Transmission Theory, System Noise Temperature and G/T ratio, Basic Link analysis, Interference Analysis, Design of satellite Links for a specified C/N, (With and without frequency Re-use), Link Budget.

UNIT -III:

Propagation Effects: Introduction, Atmospheric Absorption, Cloud Attenuation,

Tropospheric and Ionospeheric Scintillation and Low angle fading, Rain induced attenuation, rain induced cross polarization interference. Multiple Access:Frequency Division Multiple Access (FDMA) -Intermodulation, Calculation of C/N, Time Division Multiple Access (TDMA) -Frame Structure, Burst Structure, Satellite switched TDMA, On-board Processing, Demand Assignment Multiple Access (DAMA) –Types of Demand Assignment, Characteristics, CDMA Spread Spectrum Transmission and Reception.

UNIT -IV:

Earth Station Technology: Transmitters, Receivers, Antennas, Tracking Systems, Terrestrial Interface, Power Test Methods, Lower Orbit Considerations.Satellite Navigation and Global Positioning Systems:Radio and Satellite Navigation, GPS Position Location Principles, GPS Receivers, GPS C/A Code Accuracy, Differential GPS.

UNIT -V:

Satellite Packet Communications: Message Transmission by FDMA: M/G/1 Queue, Message Transmission by TDMA, PURE ALOHA-Satellite Packet Switching, Slotted Aloha, Packet Reservation, Tree Algorithm.

TEXT BOOKS:

1. Satellite Communications –Timothy Pratt, Charles Bostian, Jeremy Allnutt, 2ndEdition, 2003, John Wiley & Sons.
2. Satellite Communications Engineering –Wilbur, L. Pritchand, Robert A. Nelson and Heuri G.Suyderhoud, 2ndEd., Pearson Publications.
3. Digital Satellite Communications-Tri.T.Ha, 2ndEdition, 1990, Mc.Graw Hill.

REFERENCE BOOKS:

1. Satellite Communications-Dennis Roddy, 2ndEdition, 1996, McGraw Hill.
2. Satellite Communications: Design Principles –M. Richcharia, 2ndEd., BSP, 2003.
3. Digital Satellite Communications –Tri. T. Ha, 2ndEd., MGH, 1990.
4. Fundamentals of Satellite Communications –K. N. Raja Rao, PHI, 2004.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

IV Year B.Tech ECE-I Sem **L / T / P /C**
3 / 0 / 0 / 3

(1804PE11) DSP ARCHITECTURE

(Professional Elective – IV)

COURSE OBJECTIVES:

- To introduce architectural features of programmable DSP Processors of TI and Analog Devices.
- To recall digital transform techniques.
- To give practical examples of DSP Processor architectures for better understanding.
- To develop the programming knowledge using Instruction set of DSP Processors.
- To understand interfacing techniques to memory and I/O devices.

COURSE OUTCOMES:

Upon completion of the course the student will be able to:

- To introduce architectural features of programmable DSP Processors of TI and Analog Devices..
- To recall digital transform techniques.
- To give practical examples of DSP Processor architectures for better understanding.
- To familiarize students with the architecture, memory, addressing, and programmability of DSP devices, emphasizing speed and external interfacing features..
- To develop the programming knowledge using Instruction set of DSP Processors..
- To understand interfacing techniques to memory and I/O devices

UNIT –I:

Introduction to Digital Signal Processing:

Introduction, A Digital signal-processing system, The sampling process, Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), Linear time-invariant systems, Digital filters, Decimation and interpolation.

Computational Accuracy in DSP Implementations:

Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT –II:

Architectures for Programmable DSP Devices:

Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation UNIT, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT -III:

Programmable Digital Signal Processors:

Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX

DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline operation of TMS320C54XX Processors.

UNIT –IV:

Analog Devices Family of DSP Devices:

Analog Devices Family of DSP Devices – ALU and MAC block diagram, Shifter Instruction, Base Architecture of ADSP 2100, ADSP-2181 high performance Processor.

Introduction to Blackfin Processor - The Blackfin Processor, Introduction to Micro Signal Architecture, Overview of Hardware Processing Units and Register files, Address Arithmetic Unit, Control Unit, Bus Architecture and Memory, Basic Peripherals.

UNIT –V:

Interfacing Memory and I/O Peripherals to Programmable DSP Devices:

Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA).

TEXT BOOKS:

1. Digital Signal Processing – Avtar Singh and S. Srinivasan, Thomson Publications, 2004.
2. A Practical Approach to Digital Signal Processing - K Padmanabhan, R. Vijayarajeswaran, Ananthi. S, New Age International, 2006/2009
3. Embedded Signal Processing with the Micro Signal Architecture Publisher: Woon-Seng Gan, Sen M. Kuo, Wiley-IEEE Press, 2007

REFERENCE BOOKS:

1. Digital Signal Processors, Architecture, Programming and Applications – B.Venkataramani and M. Bhaskar, 2002, TMH.
2. Digital Signal Processing – Jonatham Stein, 2005, John Wiley.'
3. DSP Processor Fundamentals, Architectures & Features – Lapsley et al. 2000, S. Chand & Co.
4. Digital Signal Processing Applications Using the ADSP-2100 Family by The Applications Engineering Staff of Analog Devices, DSP Division, Edited by Amy Mar, PHI.
5. The Scientist and Engineer's Guide to Digital Signal Processing by Steven W. Smith, Ph.D., California Technical Publishing, ISBN 0-9660176-3-3, 1997 6.Embedded Media Processing by David J. Katz and Rick Gentile of Analog Devices, Newnes, ISBN 0750679123, 2005

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

IV Year B.Tech ECE-I Sem **L / T / P /C**
3 / 0 / 0 / 3

(1804PE12) EMBEDDED SYSTEMS

(Professional Elective – IV)

Course Objectives:

- To provide an overview of Design Principles of Embedded System.
- To provide clear understanding about the role of firmware, operating systems in correlation with hardware systems.

Course Outcomes:

- Understand the fundamentals of embedded systems, including their definition, characteristics, quality attributes, and comparison with general computing systems.
- Describe the core components of embedded systems, including processors, ASICs, PLDs, and COTS, and understand their application in different embedded systems..
- Analyze and select appropriate memory types (ROM, RAM), sensors, actuators, and communication interfaces for embedded systems.
- Develop embedded firmware for basic system components, including reset circuits, oscillators, real-time clocks, and watchdog timers...
- Understand RTOS basics, types of operating systems, and design principles of RTOS-based embedded systems, including task scheduling and multitasking...
- Implement task communication and synchronization techniques in embedded systems, and select appropriate RTOS based on system requirements.

UNIT - I

Introduction to Embedded Systems: Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

UNIT - II

Typical Embedded System: Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS).

Memory: ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators, Communication Interface: Onboard and External Communication Interfaces.

UNIT - III

Embedded Firmware: Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware Design Approaches and Development Languages.

UNIT - IV

RTOS Based Embedded System Design: Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.

UNIT - V

Task Communication: Shared Memory, Message Passing, Remote Procedure Call and Sockets, Task Synchronization: Task Communication/Synchronization Issues, Task Synchronization Techniques, Device Drivers, How to Choose an RTOS.

TEXT BOOKS:

1. Introduction to Embedded Systems - Shibu K.V, Mc Graw Hill.

REFERENCE BOOKS:

1. Embedded Systems - Raj Kamal, MC GRAW HILL EDUCATION.
2. Embedded System Design - Frank Vahid, Tony Givargis, John Wiley.
3. Embedded Systems – Lyla, Pearson, 2013
4. An Embedded Software Primer - David E. Simon, Pearson Education.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

IV Year B. Tech ECE-II Sem **L / T / P /C**
3 / 0 / 0 / 3

(1804PE13) RADAR SYSTEMS

(Professional Elective – V)

Course Objectives:

- To explore the concepts of radar and its frequency bands.
- To understand Doppler effect and get acquainted with the working principles of CW radar, FM-CW radar.
- To impart the knowledge of functioning of MTI and Tracking Radars. To explain the deigning of a Matched Filter in radar receivers.

Course Outcomes: Upon completing this course, the student will be able to

- Understand the basic concepts of radar systems, radar equations, and their applications in predicting range performance
- Analyze the principles and operations of CW and FM-CW radar for range and Doppler measurements
- Apply concepts of MTI and pulse Doppler radar to filter characteristics, blind speeds, and staggered PRFs.
- Examine various tracking radar techniques such as sequential lobing, conical scanning, and monopulse tracking.
- Evaluate radar signal detection in noise using matched filter receivers and non-matched filters.
- Discuss phased array antennas, beam steering, and their advantages and limitations in radar systems

UNIT – I

Basics of Radar: Maximum Unambiguous Range, Simple form of Radar Equation, Radar Block Diagram and Operation, Radar Frequencies and Applications. Prediction of Range Performance, Minimum Detectable Signal, Receiver Noise, Modified Radar Range Equation.

Radar Equation: SNR, Envelope Detector – False Alarm Time and Probability, Integration of Radar Pulses, Radar Cross Section of Targets, Transmitter Power, PRF and Range Ambiguities, System Losses (qualitative treatment).

UNIT – II

CW and Frequency Modulated Radar: Doppler Effect, CW Radar – Block Diagram, Isolation between Transmitter and Receiver, Non-zero IF Receiver, Receiver Bandwidth Requirements, Applications of CW radar.

FM-CW Radar: Range and Doppler Measurement, Block Diagram and Characteristics, FM-CW altimeter.

UNIT - III

MTI and Pulse Doppler Radar: Principle, MTI Radar - Power Amplifier Transmitter and Power Oscillator Transmitter, Delay Line Cancellers – Filter Characteristics, Blind Speeds, Double Cancellation, Staggered PRFs. Range Gated Doppler Filters. MTI Radar Parameters, Limitations to MTI Performance, MTI versus Pulse Doppler Radar.

UNIT – IV

Tracking Radar: Tracking with Radar, Sequential Lobing, Conical Scan, Mono pulse Tracking Radar – Amplitude Comparison Mono pulse (one- and two- coordinates), Phase Comparison Mono pulse, Tracking in Range, Acquisition and Scanning Patterns, Comparison of Trackers.

UNIT – V

Detection of Radar Signals in Noise Matched Filter Receiver – Response Characteristics and Derivation, Correlation Function and Cross-correlation Receiver, Efficiency of Non-matched Filters, Matched Filter with Non-white Noise.

Radar Receivers – Noise Figure and Noise Temperature, Displays – types. Duplexers – Branch type and Balanced type, Circulators as Duplexers. Introduction to Phased Array Antennas – Basic Concepts, Radiation Pattern, Beam Steering and Beam Width changes, Applications, Advantages and Limitations.

TEXT BOOK:

1. Introduction to Radar Systems – Merrill I. Skolnik, TMH Special Indian Edition, 2nd Ed., 2007.

REFERENCE BOOKS:

1. Radar: Principles, Technology, Applications – Byron Edde, Pearson Education, 2004.
2. Radar Principles – Peebles, Jr., P.Z., Wiley, New York, 1998.
3. Principles of Modern Radar: Basic Principles – Mark A. Richards, James A. Scheer, William A. Holm, Yesdee, 2013
4. Radar Handbook - Merrill I. Skolnik, 3rd Ed., McGrawHill Education, 2008.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

IV Year B.Tech ECE-II Sem **L / T / P /C**
3 / 0 / 0 / 3

(1804PE14) SPEECH & AUDIO PROCESSING

(Professional Elective – V)

Course Objectives: The objectives of this course are to make the student

- Understand the anatomy and Physiology of Speech Production system and perception model and to design an electrical equivalent of Acoustic model for Speech Production.
- To understand the articulatory and acoustic interpretation of various phonemes and their allophones.
- To analyze the speech in time domain and extract various time domain parameters which can be used for various applications like pitch extraction, end point detection, Speech Compression, Speech Synthesis etc.,
- To study the concept of Homomorphic system and its use in extracting the vocal tract information from speech using Cepstrum which is a bye product of Homomorphic processing of Speech.
- To study various Speech Signal Processing applications viz: Speech Enhancement, Speech Recognition, Speaker Recognition.
- To study various Audio coding techniques based on perceptual modeling of the human ear.

Course Outcomes: On completion of this course student will be able to

- Understand the anatomy and physiology of speech organs and the acoustic theory of speech production
- Analyze time-domain models for speech processing, including energy, zero-crossing, and LPC-based techniques.
- Evaluate homomorphic speech processing techniques and speech enhancement methods for noise reduction.
- Apply automatic speech recognition and speaker recognition techniques using pattern recognition approaches and HMM
- Discuss audio coding methods, including psychoacoustics and MPEG standards for efficient audio representation
- Design and implement speech processing systems for tasks like pitch detection, formant estimation, and speaker verification.

Unit – I: Fundamentals of Digital Speech Processing: Anatomy & Physiology of Speech Organs, The Process of Speech Production, The Acoustic theory of speech production- Uniform lossless tube model, effect of losses in vocal tract, effect of radiation at lips, Digital models for speech signals. Perception : Anatomical pathways from the Ear to the Perception of Sound, The

Peripheral Auditory system, Hair Cell and Auditory Nerve Functions, Properties of the Auditory Nerve. Block schematics of the Peripheral Auditory system.

Unit – II : Time Domain models for Speech Processing: Introduction – Window considerations, Short time energy, average magnitude, average zero crossing rate, Speech vs Silence discrimination using energy and zero crossing, pitch period estimation using a parallel processing approach, the short time autocorrelation function, average magnitude difference function, pitch period estimation using the autocorrelation function. Linear Predictive Coding (LPC) Analysis : Basic principles of Linear Predictive Analysis : The Autocorrelation Method, The Covariance method, Solution of LPC Equations : Cholesky Decomposition Solution for Covariance Method, Durbin's Recursive Solution for the Autocorrelation Equations, comparison between the methods of solution of the LPC Analysis Equations, Applications of LPC Parameters : Pitch Detection using LPC Parameters, Formant Analysis using LPC Parameters.

Unit – III : Homomorphic Speech Processing: Introduction , Homomorphic Systems for Convolution : Properties of the Complex Cepstrum, Computational Considerations , The Complex Cepstrum of Speech, Pitch Detection , Formant Estimation, The Homomorphic Vocoder. Speech Enhancement: Speech enhancement techniques : Single Microphone Approach, Spectral Subtraction, Enhancement by re-synthesis, Comb filter, Wiener filter, Multi Microphone Approach.

Unit – IV: Automatic Speech Recognition: Basic pattern recognition approaches, parametric representation of Speech, Evaluating the similarity of Speech patterns, Isolated digit Recognition System, Continuous word Recognition system. Elements of HMM, Training & Testing of Speech using HMM. Automatic Speaker Recognition: Recognition techniques, Features that distinguish speakers, MFCC, delta MFCC, Speaker Recognition Systems: Speaker Verification System , Speaker Identification System, Performance Metrics.

Unit – V: Audio Coding : Lossless Audio Coding, Lossy Audio coding, Psychoacoustics , ISO-MPEG-1 Audio coding , MPEG - 2 Audio coding, MPEG - 2 Advanced Audio Coding, MPEG - 4 Audio Coding.

TEXT BOOKS:

1. Digital Processing of Speech Signals - L.R. Rabiner and S. W. Schafer. Pearson Education.
2. Digital Audio Signal Processing – Udo Zolzer, 2nd Edition, Wiley.
3. Speech & Audio Signal Processing- Ben Gold & Nelson Morgan, 1st Ed., Wiley

REFENCE BOOKS:

1. Discrete Time Speech Signal Processing: Principles and Practice - Thomas F. Quateri, 1st Ed., PE.
2. Digital Processing of Speech Signals. L.R Rabinar and R W Jhaung, 1978, PHI.
3. Speech Communications: Human & Machine - Douglas O'Shaughnessy, 2nd Ed., EEE Press.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

IV Year B.Tech ECE-II Sem **L / T / P /C**
3 / 0 / 0 / 3

(1804PE15) CMOS DESIGN

(Professional Elective – V)

Course Objectives:

- Analog circuits play a very crucial role in all electronic systems and due to continued miniaturization; many of the analog blocks are not getting realized in CMOS technology.
- To understand most important building blocks of all CMOS analog Ics.
- To study the basic principle of operation, the circuit choices and the tradeoffs involved in theMOS transistor level design common to all analog CMOS ICs.
- Understand basic programmable logic devices and testing of CMOS circuits.

Course Outcomes: After studying the course, each student is expected to be able to

- Understand and Model MOS Devices
- Design and Analyze Analog CMOS Sub-Circuits
- Construct CMOS Amplifiers
- Design and Optimize CMOS Operational Amplifiers
- Characterize and Improve Comparator Performance
- Simulate and Implement Integrated Circuit Layouts

Unit-I

Introduction: Introduction to IC Technology – MOS, PMOS, NMOS, CMOS & BiCMOS.

Basic Electrical Properties: Basic Electrical Properties of MOS and BiCMOS Circuits: Ids-Vdsrelationships, MOS transistor threshold Voltage, gm, gds, Figure of merit; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

Unit-II:

VLSI Circuit Design Processes and Gate Level Design: VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, Transistors Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits.

Unit-III:

Gate Level Design: Logic Gates and Other complex gates, Switch logic, Alternate gate circuits, Time delays, Driving large capacitive loads, Wiring capacitance, Fan – in, Fan – out.

Unit-IV:

MOS Devices and Modeling: The MOS Transistor, Passive Components- Capacitor & Resistor, CMOS Device Modeling - Simple MOS Large-Signal Model, Small- Signal Model for the MOS Transistor.

Analog CMOS Sub-Circuits: MOS Switch, MOS Diode, MOS Active Resistor, Current Sinks and Sources.

UNIT- V:

Programmable Logic Devices: PLAs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic, Design Approach, Parameters influencing low power design.

CMOS Testing: CMOS Testing, Need for testing, Test Principles, Design Strategies for test, Chip level Test Techniques.

TEXT BOOKS:

1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Dougles and A. Pucknell, PHI, 2005 Edition
2. CMOS Analog Circuit Design - Philip E. Allen and Douglas R. Holberg, Oxford University Press, International Second Edition/Indian Edition, 2010.

REFERENCES

1. Analog Integrated Circuit Design- David A. Johns, Ken Martin, Wiley Student Edn, 2013.
2. Design of Analog CMOS Integrated Circuits- Behzad Razavi, TMH Edition.
3. CMOS logic circuit Design - John. P. Uyemura, Springer, 2007.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

IV Year B.Tech ECE-II Sem **L / T / P /C**
3 / 0 / 0 / 3

(1804PE16) WIRELESS SENSOR NETWORKS

(Professional Elective – VI)

Course Objectives:

- To acquire the knowledge about various architectures and applications of Sensor Networks
- To understand issues, challenges and emerging technologies for wireless sensor networks
- To learn about various routing protocols and MAC Protocols
- To understand various data gathering and data dissemination methods
- To Study about design principals, node architectures, hardware and software required for
- Implementation of wireless sensor networks.

Course Outcomes: Upon completion of the course, the student will be able to:

- Understand the fundamentals, constraints, challenges, advantages, and types of sensor networks.
- Compare Mobile Ad-hoc Networks (MANETs) and Wireless Sensor Networks (WSNs) and analyze enabling technologies.
- Evaluate and apply routing and MAC protocols like S-MAC, B-MAC, IEEE 802.15.4, and ZigBee in sensor networks.
- Analyze data dissemination, gathering, fusion protocols, and real-time traffic support in sensor networks.
- Design and evaluate the principles of WSNs, including gateway concepts and communication with the internet.
- Understand the architecture, hardware, and operating systems for WSNs, with focus on Tiny OS and nesC.

UNIT - I:

Introduction to Sensor Networks, unique constraints and challenges, Advantage of Sensor Networks,Applications of Sensor Networks, Types of wireless sensor networks

UNIT - II:

Mobile Ad-hoc Networks (MANETs) and Wireless Sensor Networks, Enabling technologies for WirelessSensor Networks. Issues and challenges in wireless sensor networks

UNIT - III:

Routing protocols, MAC protocols: Classification of MAC Protocols, S-MAC Protocol, B-MAC protocol, IEEE 802.15.4 standard and ZigBee

UNIT - IV:

Dissemination protocol for large sensor network. Data dissemination, data gathering, and data fusion; Quality of a sensor network; Real-time traffic support and security protocols.

UNIT - V:

Design Principles for WSNs, Gateway Concepts Need for gateway, WSN to Internet Communication, and Internet to WSN Communication. Single-node architecture, Hardware components & design constraints, Operating systems and execution environments, introduction to TinyOS and nesC.

TEXT BOOKS:

1. Ad-Hoc Wireless Sensor Networks- C. Siva Ram Murthy,B. S. Manoj, Pearson
2. Principles of Wireless Networks – Kaveh Pah Laven and P. Krishna Murthy, 2002, PE

REFERENCE BOOKS:

1. Wireless Digital Communications – Kamilo Feher, 1999, PHI.
2. Wireless Communications-Andrea Goldsmith, 2005 Cambridge University Press.
3. Mobile Cellular Communication – Gottapu Sasibhushana Rao, Pearson Education, 2012.
4. Wireless Communication and Networking – William Stallings, 2003, PHI.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

IV Year B.Tech ECE-II Sem **L / T / P /C**
3 / 0 / 0 / 3

(1804PE17) CONSUMER ELECTRONICS

(Professional Elective – VI)

COURSE OUTCOMES: Upon the completion of this course, students will demonstrate the

ability to:

- Explain the functioning and design of audio systems, including microphones, loudspeakers, and theater sound systems
- Describe video systems and display technologies, including monochrome, color TVs, HDTV, LED, and DTH systems
- Demonstrate the working principles of domestic and consumer appliances like washing machines, microwave ovens, and air conditioners
- Analyze power supply systems like SMPS and UPS and their preventive maintenance techniques
- Evaluate RFID product compliance in terms of electrical safety, EMI/EMC standards, and RF interference design techniques.
- Apply preventive maintenance methods and remote control technologies for enhancing consumer electronics systems.

UNIT-I:

Audio System : Microphones, loudspeakers baffle and enclosure, Acoustics, mono, stereo, Quad, Amplifying System, Equalizers and Mixers Synthesizers, Commercial Sound, Theater Sound System.

UNIT-II:

Video Systems and Displays: Monochrome, Color TV standards, TFT, Plasma, HDTV, LCD,LED TV, Direct-ToHome(DTH- Set Top Box), Video Telephone and Video Conferencing.

UNIT-III:

Domestic & Consumer Appliances: Washing machines, Microwave ovens, Air-conditioners and Refrigerators, Computers office System, Telephone & Mobile Radio System

UNIT-IV

Power Supplies SMPS/UPS and Preventive Maintenance and others systems such as Remote controls, Bar codes.

UNIT-V

RFID Product Compliance: Product safety and liability issues; standards related to electrical safety and fire hazards, EMI/EMC requirements, design techniques for ESD, RF interference and immunity,line current harmonics and mains voltage surge.

TEXT BOOKS

1. Consumer Electronics; SP Bali; Pearson Education.
2. Consumer Electronics; J.S. Chitode; Technical Publications, Pune.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN
(Autonomous Institution-UGC, Govt. of India)

IV Year B. Tech ECE-II Sem **L / T / P /C**
3 / 0 / 0 / 3

(1804PE18) MIXED SIGNAL PROCESSING

(Professional Elective – VI)

OBJECTIVES:
The student should be made to:

- Study the mixed signal of submicron CMOS circuits•
- Understand the various integrated based filters and topologies•
- Learn the data converters architecture, modeling and signal to noise ratio•
- Study the integrated circuit of oscillators and PLLs

OUTCOMES:

- Explain submicron CMOS circuit design principles, including MOSFET models, delay elements, and Op-Amp design
- Analyze integrator-based CMOS filters and filtering topologies for various signal processing applications.
- Compare and contrast data converter architectures, including DACs and ADCs, for mixed signal systems.
- Evaluate data converter modeling, quantization noise, and methods to improve SNR for ADCs and DACs.
- Describe the principles and design of oscillators and PLLs, including their non-ideal effects and applications in signal processing..
- Design and implement mixed-signal circuits using CMOS technology for real-world applications.

UNIT I: SUBMICRON CMOS CIRCUIT DESIGN

Submicron CMOS: Overview and Models, CMOS process flow, Capacitors and Resistors. Digital circuit design: The MOSFET Switch, Delay Elements, An Adder. Analog Circuit Design: Biasing, Op-Amp Design, Circuit Noise.

UNIT II: INTEGRATOR BASED CMOS FILTERS

Integrator Building Blocks- low pass filter, Active RC integrators, MOSFET-C Integrators, gmC integrators, Discrete time integrators. Filtering Topologies: The Bilinear transfer function, The Biquadratic transfer function, Filters using Noise shaping.

UNIT III

DATA CONVERTER ARCHITECTURES

DAC Architectures- Resistor string, R-2R ladder Networks, Current Steering, Charge Scaling

DACs, Cyclic DAC, and Pipeline DAC. ADC Architectures- Flash, Two-step flash ADC, Pipeline ADC, Integrating ADC's, Successive Approximation ADC.

UNIT IV
DATA CONVERTER MODELING AND SNR

Sampling and Aliasing: A modeling approach, Impulse sampling, The sample and Hold, Quantization noise. Data converter SNR: An overview, Clock Jitter, Improving SNR using Averaging, Decimating filter for ADCs, Interpolating filter for DACs, Band pass and High pass sinc filters - Using feedback to improve SNR

UNIT V

OSCILLATORS AND PLL

LC oscillators, Voltage Controlled Oscillators. Simple PLL, Charge pumps PLLs, Non ideal effects in PLLs, Delay Locked Loops.

TEXT BOOKS :

1. CMOS Mixed Signal Circuit Design by R.Jacob Baker, Wiley India, IEEE Press, reprint 2008.
2. CMOS Circuit Design, Layout and Simulation by R.Jacob Baker, Wiley India, IEEE Press, Second Edition, reprint 2009.
3. Design of Analog CMOS Integrated Circuits by Behzad Razavi, McGraw Hill, 33rd Reprint, 2016

REFERENCES:

1. R. Gregorian and Temes - Analog MOS integrated circuits for signal processing
2. R.Gregorian - Introduction to CMOS opamps and comparators.
3. D.Johns and K.Martin - Analog integrated circuit design 4. B.Razavi - Monolithic Phase-locked loops and clock recovery circuits: Theory and design